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THE

AMERICAN CYCLOPÆDIA.

VOL. II.

ASHES—BOL.

THE

AMERICAN CYCLOPÆDIA:

A

Popular Dictionary

OF

GENERAL KNOWLEDGE.

EDITED BY

GEORGE RIPLEY AND CHARLES A. DANA.

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THE

AMERICAN CYCLOPÆDIA.

ASHES

Ashes, the solid remains after the burning of combustible substances. When a vegetable or animal substance is burned with free access of air, part of it is resolved into volatile compounds, chiefly water, carbonic acid, and free nitrogen, while the other and generally the smaller portion is left as incombustible residue or ash. If the substance be decomposed with exclusion of the air, a different set of compounds results; and the residue may be charcoal, bone black, or some other substance, depending upon the nature of the material taken for the experiment. Of wood ashes, even the different parts of the same plant furnish different quantities, and ashes of different compositions. The soil itself has an influence upon the kind and amount of materials taken up by the plants. Nearly all the substances found in the soil enter into the composition of vegetable matters, and are found in their ashes. Alumina is, however, very rarely met with. No inorganic substances found in the ashes of plants come from any other source but the soil. Of the portion of wood ashes soluble in water, and removed from them by leaching or lixiviation, the greater part consists of the carbonate, silicate, sulphate, and chloride of potassium. Of the insoluble portion (leached ashes), carbonate of lime commonly forms about one half; the remainder is mostly silicate and phosphate of lime, oxide of iron, and salts of magnesia. It is not supposed that the bases were combined with carbonic acid in the plants, but with organic acids, and that these were replaced by carbonic acid in the process of combustion. Plants that grow in and near salt water contain soda instead of potassa, deriving it from sea salt. The following examples show how the quantity of ashes varies with the wood: From 1,000 parts by weight of oak, well dried, Kirwan obtained of ashes 13·5 parts; from elm, 23·5; willow, 28; poplar, 12·2; ash, 5·8; pine, 3·4. The bark furnishes more ashes than the solid wood, and the branches than the trunk. Peat and coal ashes contain a large proportion of alumina; oxide of iron, carbonate and sulphate of lime, are also found in them. The principal uses of wood ashes are for making soaps and for enriching land. The soluble salts of potash are dissolved out from them, and oil or fatty matters added to the alkali, to produce the soap. The residue is a valuable manure, but evidently inferior to the ashes before the potash was extracted. Pot and pearl ashes are the salts of potash extracted from wood ashes. The name potash is traced to the method of its preparation from the extract of the ashes boiled down in iron pots. Barilla, or soda ash, is a similar product of sea plants, soda replacing the potash. It was formerly largely imported into this country, but is now excluded by cheaper preparations of soda direct from sea salt. Ashes are sometimes used with lime and sand to increase the strength of mortar, and prevent its cracking. —Bone ashes contain much phosphate of lime, the cause of the fertilizing properties of bones. Phosphoric acid and phosphorus are prepared from these ashes. They are also used to make the cupels in which argentiferous lead is melted and oxidized for obtaining the pure silver. The cupels are merely bone ashes made into a paste with water, or beer and water, and then moulded and dried.—In distilleries, ashes find an extensive use for the rectification of the alcoholic liquors, the alkaline matters neutralizing any acids that may be present, and thus preventing their volatilization. It is a common impression that their great consumption in American distilleries is to give strength to the liquors after their dilution with water, and this is confirmed by the violent caustic quality, not unlike that of the ley of ashes, for which much of the common whiskey of the country is remarkable. Ashes mixed with salt make a strong cement for iron pipes. Cracked pipes repaired with it bear as heavy pressure as new pipes. The cement sets on application of heat of 600°.—**Shower of Ashes,** a phenomenon

which frequently accompanies the eruption of a volcano. Quantities of matter resembling fine gray or black ashes are thrown aloft from the crater to prodigious heights, and borne by the winds to an astonishing distance. On the eruption of the volcano Tomboro, in the island of Sumbawa, east of Java, in the year 1815, a shower of ashes fell for 19 hours in succession. An English cruiser, 100 m. away from the island, was surrounded by the cloud, and received from it an addition to its freight of several tons' weight, and a Malayan ship was covered 3 feet deep. The ashes fell upon the islands of Amboyna and Banda, the latter 800 m. to the eastward, and this apparently in the face of the S. E. monsoon, which was then blowing, but really carried by a counter current, the existence of which in the higher regions of the atmosphere was then first established. A similar phenomenon was observed in the eruption, in January, 1835, of the volcano Coseguina, on the S. side of the gulf of Fonseca in Guatemala. Its ashes were carried to the eastward, over the current of the trade winds, and fell at Truxillo, on the shores of the gulf of Mexico. Ashes from Etna were deposited in Malta in 1329; and in A. D. 79 the cities of Herculaneum and Pompeii, which had 16 years before been visited by an earthquake, were buried beneath the showers which fell from the neighboring volcano of Vesuvius. Volcanic ash is a mechanical mixture of minerals and rocks absorbed by trituration against each other, and consequently exhibits great difference of structure and composition. Not being a product of combustion, it can hardly be called a true ash.

ASHFORD, a town of Kent, England, 45 m. S. E. of London; pop. 5,500. It has damask manufactories, and the population is rapidly increasing in consequence of the favorable situation of the town at the junction of three railroad lines.

ASHLAND. I. A N. E. county of Ohio; area, 340 sq. m.; pop. in 1870, 21,933. It is crossed by the Ohio and Pennsylvania and the Pittsburgh, Fort Wayne, and Chicago railroads. Its surface is hilly and undulating, and the soil is of unsurpassed fertility. In 1870 the county produced 467,684 bushels of wheat, 537,798 of Indian corn, 551,245 of oats, 117,416 of potatoes, 33,674 tons of hay, 344,187 lbs. of wool, 668,473 of butter, 418,011 of cheese, 733,855 of flax, and 110,742 of maple sugar. Capital, Ashland. **II.** A new N. W. county of Wisconsin, bounded N. by Lake Superior, and separated on the N. E. from Michigan by the Montreal river; area, about 1,500 sq. m.; pop. in 1870, 221. The county is drained in its southern portion by affluents of the Chippewa river. Iron ore is found in a ridge called Iron mountain, which is 1,200 feet high.

ASHLEY, a S. E. county of Arkansas, bordering on Louisiana, bounded W. by the Sabine and Washita rivers, and intersected in the west by Bayou Bartholomew; area, 870 sq. m.; pop. in 1870, 8,042, of whom 3,764 were colored. The surface is undulating and highly fertile. In 1870 the county produced 201,905 bushels of Indian corn, 34,269 of sweet potatoes, and 7,856 bales of cotton. Capital, Fountain Hill.

ASHMOLE, Elias, an English antiquary, founder of the Ashmolean museum at Oxford, born in Lichfield, May 23, 1617, died in London, May 18, 1692. He was a chancery solicitor. In the civil war he quitted London and settled at Oxford, adopted the royalist cause and became captain in Lord Ashley's regiment of horse, and after the battle of Worcester withdrew to Cheshire. On the restoration Charles II. bestowed upon him the offices of Windsor herald, commissioner of excise, and secretary of Surinam, with other appointments. He was for a time the intimate associate of the astrologers and alchemists Lilly, Booker, Sir Jonas Moore, and Wharton, and in 1650 translated and published Dr. Dee's *Fasciculus Chymicus* and *Arcanum* (on the Hermetic philosophy, &c.). He compiled a collection of the various unpublished writers on chemistry, which in 1652 he published under the title of *Theatrum Chymicum Britannicum.* In 1658 he announced that he had abandoned astrology and alchemy in his "Way to Bliss," a treatise on the philosopher's stone. In 1650 he had made a catalogue of the coins in the Bodleian library, and in 1659 obtained from the younger Tradescant the museum of coins and curiosities which he and his father had collected at their house in Lambeth. In 1672 he presented to the king a history of the order of the garter, for which he received a grant of £400. He was also the author of "History and Antiquities of Berkshire," and of an autobiography. In 1679 his chambers in the Temple were burned, and the greater part of his library, with 9,000 ancient and modern coins, destroyed. The rest of his valuable collection of coins was presented to the university of Oxford, which prepared a suitable building for them in 1682. His books were transferred to the same institution according to his will.

ASHMUN, Jehudi, agent of the American colonization society, born in Champlain, N. Y., in April, 1794, died in New Haven, Conn., Aug. 25, 1828. He graduated at Burlington college in 1816, and after preparing for the ministry was chosen a professor in the theological seminary at Bangor. Removing soon after to the District of Columbia, he engaged in the service of the colonization society, at first as editor of a monthly journal, but sailed for Africa, June 19, 1822, to take charge of a reënforcement for the colony of Liberia. Upon his arrival he found himself called upon to act, as the supreme head of a small and disorganized community surrounded by enemies. In a short time he reanimated the spirit of the colonists, and restored their discipline. Three months after his arrival, by the aid of some fortifications he had constructed, and his own extraordinary bravery and conduct, they re-

pelled a surprise from a party of 800 savages, and defeated them entirely a few days later. When obliged by ill health to abandon the country, March 26, 1828, he left a community of 1,200 freemen.

ASHTABULA, a N. E. county of Ohio, bordering on Lake Erie and Pennsylvania; area, 420 sq. m.; pop. in 1870, 32,517. The surface is level, the soil clayey and adapted to grazing purposes. It is drained by Grand and Conneaut rivers, and traversed by two railroads. In 1870 the county produced 190,191 bushels of wheat, 557,632 of oats, 382,556 of Indian corn, 363,957 of potatoes, 58,678 tons of hay, 197,464 lbs. of wool, 1,134,877 of butter, 1,193,089 of cheese, and 146,306 of maple sugar. Capital, Jefferson.

ASHTON-UNDER-LYNE, a manufacturing town and parish of Lancashire, England, on the Tame, 6 m. E. S. E. of Manchester; pop. in 1871, 32,030. The extensive factories for cotton spinning and weaving, calico printing, and other branches of the manufacture of cotton goods, employ more than 15,000 hands.

ASHTORETH (plur. *Ashtaroth;* called by the Babylonians Mylitta, by the Assyrians Ishtar, and by the Greeks Astarte, and nearly identical with the Egyptian Athor or Hathor), the great female deity of the ancient Semitic nations on both sides of the Euphrates, and chiefly of Phœnicia. By Ashtoreth was originally meant the moon—"the queen of heaven"—and subsequently the planet Venus. Under her name is supposed to have been worshipped the principle of conception and production, in contradistinction to that of generation, variously represented by Baal, Belus, or Jupiter. According to many critics, she is identical with the Asherah of the Scriptures, the divinity of happiness. In Phœnicia she was at first represented by a white conical stone; afterward with the head of a bull or a cow; and ultimately as a human being with a thunderbolt in one hand and a sceptre in the other. Ashtoreth was sometimes worshipped in groves, sometimes in temples. Cakes made in the shape of a crescent, and male kids, are said to have been the offerings in which she most delighted. Eunuchs dressed in feminine attire, or women, were her favorite priests; and many of the rites in which they indulged at her altars were of the most lascivious character. The dove, the crab, and the lion among animals, and the pomegranate among fruits, were sacred to Ashtoreth. Statues and groves consecrated to her were very numerous in Syria. In Bashan a town of Og was named from her worship, Ashtaroth Karnaim (horned Astartes). The idolatry of Ashtoreth was introduced into Israel in the days of the judges, and was not finally extirpated till the reign of Josiah.

ASH WEDNESDAY, the first day of Lent, called by the fathers of the church *caput jejunii,* the beginning of the fast, or *dies cinerum,* ash day, in allusion to the custom of sprinkling the head with ashes. In the Roman Catholic church, on this day the priest marks the sign of the cross with ashes on the foreheads of the people, repeating the words, *Memento, homo, quod pulvis es, et in pulverem reverteris:* "Remember, man, that thou art dust, and unto dust shalt return."

ASIA, the largest of the recognized continental divisions of the globe. The name, which was originally used in a much more limited sense than at present, comes to us from the Greeks, though believed by many to be of Semitic origin; its import is still a matter of question. The estimates of the area of Asia differ very considerably. That of Élisée Reclus gives the extent of the continents as follows, in square miles: Asia, 16,771,879; America, 14,902,989; Africa, 11,244,958; Europe, 3,822,320; Australia, 2,972,916; total, 49,725,062. Thus, considering Australia a continent, Asia comprehends almost exactly one third of the solid land of the globe, exclusive of the great groups of islands called Micronesia, Melanesia, and Polynesia. In this estimate the Japanese islands are regarded as belonging to Asia, although separated from the continent by considerable channels. Asia, thus considered, is bounded by the Arctic ocean, the Pacific, the Indian ocean, the Red sea, the Mediterranean, the Archipelago, the Black and Caspian seas, and European Russia. On the extreme N. E. it is cut off from America only by the narrow Behring strait. Between Asia and Africa the only connection is the isthmus of Suez. The separation between Europe and Asia is rather geographical than physical or political, the low range of the Ural mountains, which for the greater part forms the nominal line, being little more than a watershed, and running almost midway through the Russian empire. Europe is physically a corner arbitrarily cut off from the northwest of the great Asian continent. The bulk of Asia forms a solid square lying between the Arctic circle and the tropic of Cancer, and lon. 65° and 120° E. Among the projections from this solid square on the west are the peninsulas of Asia Minor and Arabia; on the north, the Siberian capes; on the east, the N. E. extremity of Siberia, with its southern prolongation of Kamtchatka and the peninsula of Corea; on the south, India and the Malay peninsula. Asia as a whole forms a great trapezium, its main axis running N. E. to S. W., chiefly through Siberia, the intersecting line passing N. and S., nearly on the meridian of 100°, from Siberia on the north, in lat. 78°, to the S. extremity of the Malay peninsula on the south, almost under the equator. Including the Japanese islands, and a few others which may be properly considered as belonging to the continent, Asia thus extends from lat. 78° N. to the equator; or, including the islands of Sumatra and Java, and some minor insular prolongations of the Malay peninsula, to lat. 10° S.; and from lon. 26° E. to 190° E., equivalent, counted in the other direction, to 170° W. Asia

thus includes every climate of the globe, and all varieties of soil and production. The coast is deeply indented on every side. On the west it is cut into by the Mediterranean and the Black sea; on the north by numerous bays and gulfs of the Arctic ocean; on the east by the Okhotsk sea, the sea of Japan, the Yellow sea, and the gulf of Tonquin; on the south by the gulfs of Tonquin and Siam, the bay of Bengal, and the Arabian sea, and its prolongation, the Persian gulf. Its entire coast line is somewhat more than 33,000 m.; Reclus puts it at 35,886 m.—The great mountain ranges, which contain many of the loftiest summits on the globe, are arranged in the form of knots, from the central point of which ranges radiate in various directions. There are four grand systems, the Altai, the Hindoo Koosh, the Himalaya, and the Armenian, which divide the whole continent into a series of plains and plateaus of greater or less elevation. The central point of the Altai group is in the geographical centre of the continent, about lat. 50° N., lon. 90° E. Half way across the continent its median line runs E. and W. upon the parallel of 50° N., splitting into various folds. It sends a branch S. W., which unites with the Belur Tagh and the Hindoo Koosh; and one N. E., which under the names of the Yablonnoi and Stanovoi runs to the Arctic ocean. The Altai range separates the great northern plain of Siberia from the steppes of Mongolia and Mantchooria. The centre of the Hindoo Koosh range lies in about lat. 35° N., lon. 73° E. It branches eastward, under the names of the Kuen-lun and Karakorum, into Chinese Tartary, and westward to the S. shore of the Caspian, where the range receives the name of Elburz and approaches the Armenian group. The Hindoo Koosh, with its prolongations, separates the great desert of Gobi from China and Thibet, and divides the steppes of Turkistan from the plateau of Iran. The Himalaya, from the extreme western point, where the Indus cuts through it, to the eastern extremity, where the hills fail altogether on the right bank of the Brahmapootra, measures 2,000 m. in length, with an average breadth of 180 m. The western Himalaya, around the valley of Cashmere, has no peaks exceeding 16,000 or 18,000 ft. in height. In the middle of the range rise the stupendous peaks of Gaurisankar or Mt. Everest, 29,002 ft. above the level of the sea, Dhawalagiri, 26,826 ft., and Kinchinjunga, 28,156 ft. Aconcagua in Chili, now held to be the highest peak of the Andes, is 22,422 ft.; its head is therefore a mile and a quarter below that of Mt. Everest. Northward, under the name of Belur Tagh, the Himalaya range is continued between Independent and Chinese Tartary, where it is joined by the Thianshan mountains, which stretch into the desert of Gobi and the upland plains of Mongolia, and here and there connect with the Altai system. The eastern extremity of the Himalaya is connected with at least five chains, which radiate fanwise, traversing parts of China and Further India. The Armenian group, of which Ararat is the culminating point, lies in parallel folds at the head of the peninsula of Asia Minor, between the Caspian, the Black sea, and the Mediterranean. It connects N. with the Caucasus, a somewhat isolated chain between the Caspian and Black seas, and in the west forms the Taurus; of its southern branches, the one, Libanus, follows the course of the Mediterranean; the other, running southeastwardly, forms the eastern boundary of the Mesopotamian plain. Besides these main groups are many ranges which claim mention. Among these are the Chang-pe Shan, a coast chain of Mantchooria; the Khingan Oola, on the E. border of the desert of Gobi; the Peling, Nan-ling, Yun-ling, and Yun-nan in China proper; and the Vindhya and Eastern and Western Ghauts in Hindostan. In S. W. Asia there is the chain of the Arabian peninsula, joining on to Libanus. A notable chain branches off in the far northeast, near the arctic circle, traverses the coast of the peninsula of Kamtchatka, and disappears under the ocean, its summits appearing in the Kurile, Japanese, and Loo Choo islands. It forms the ocean rampart of the continent, enclosing between it and the mainland the seas of Okhotsk and Japan.—Apart from the mountain ranges Asia may be considered as consisting of two vast upland plateaus and six great lowland plains. The eastern plateau is a tract nearly as large as the whole of Europe, including the table land of Thibet and the desert of Gobi, extending N. to the Altai, and S. E. to the gulf of Tonquin. It is separated from Hindostan by the Himalaya range, some of the passes through which are higher than the loftiest peaks of the Alps. Cultivation is here carried on as high as 10,000 ft., and pasturage is found 2,000 ft. higher. On the southeast this table land is bounded by the Yun-nan and other almost unknown alpine ranges of China. On the north it is separated by the Altai mountains from the great plain of Siberia. The western plateau, or Iranian table land, has a general elevation of about 5,000 ft., rising sometimes to 7,000, or sinking to 2,000 or 1,200. It may be divided into three parts: Iran proper or Persia, Armenia, with Azerbijan and Kurdistan, and Asia Minor. Persia has a mean elevation of 3,000 ft. A large part of its surface consists of salt plains covered with sand and gravel. In the Armenian division, the table land is compressed to half its more eastern width. Asia Minor, the western division, is bounded along the shores of the Black sea by wooded mountains which rise to the height of 6,000 or 7,000 ft. These sections present many diversities of soil and scenery. A considerable part of Persia is barren and arid, but interspersed with beautiful valleys. The coasts of the Persian gulf are generally sandy and sterile. A large portion of Khorasan and the adjoining regions is a desert of

clayey soil, impregnated with salt and nitre, varied here and there with patches of verdure. Beloochistan is mostly an arid plain covered with coarse red sand. The mountainous region of Armenia, extending toward the Black sea, abounds in fertile valleys set among rugged hills. There are several smaller and detached plateaus. Imbedded in the Ural mountains is a large plain rich in minerals. The highlands of Syria rise gradually from the neighboring deserts to an elevation of above 10,000 ft., and slope by a succession of terraces down to the narrow coast plain of Palestine, with a deep depression, the valley of the Dead sea, 1,300 ft. below the level of the ocean. In India the plateau of the Deccan rises to the height of 1,500 or 2,000 ft., shut off by the Western Ghauts from the level coast of Malabar, by the Eastern Ghauts from that of Coromandel, and by the Vindhya and Malwa mountains from the low plains of Hindostan. There are six great Asian lowlands: 1. That of Siberia on the north, which stretches from the northern declivities of the Altai mountains to the shores of the Arctic ocean. It is mostly cold, barren, and gloomy, hardly fitted for the abode of man. 2. The lowland near the Caspian sea and the Aral, a sterile waste, much of it lying below the level of the ocean. 3. The Syro-Arabian lowland, the southern and western parts a desert, with few green spots. But wherever there is water this lowland is wonderfully productive. Its N. E. section, lying between the Euphrates and the Tigris, known formerly as Mesopotamia and Babylonia, once supported powerful nations. Though now sterile and almost uninhabited, it needs only the restoration of the ancient system of irrigation from the two great rivers to render it one of the most productive regions of the earth. 4. The lowlands of Hindostan, comprising the great Indian desert, in the northwest, together with the fertile plains of Bengal, a region not exceeded even by China for capacity to support a dense population. 5. The Indo-Chinese lowlands, comprising the long levels of Burmah, watered by the Irrawaddy, and the low alluvial regions of Cambodia and Siam. 6. The immense Chinese lowlands, commencing in lat. 40° N., and spreading southward to the tropic of Cancer. This plain, containing an area of about 200,000 sq. m., nearly that of France, supports a population of more than 100,000,000, in proportion double that of England, more by half than that of Belgium, and much more than twice that of any other country in the world, except a portion of India.—The hydrography of Asia is regulated by its mountain ranges. There are six main river systems: 1. That of Siberia comprises the Obi, the Yenisei, and the Lena, each, roughly speaking, about 2,500 m. long. These carry off the waters of the Altai chain into the Arctic ocean. The Obi, the most western of the great Siberian rivers, is formed by two rivers rising in the Altai range. In lat. 61°, a little N. of the parallel of St. Petersburg, it receives its great affluent the Irtish, and the stream falls into the Arctic ocean in lat. 67°. The double basin of the Obi occupies a third of the area of Siberia. The Yenisei drains an area of about 800,000 sq. m., receiving in its course many large branches. It debouches in lat. 72° into the gulf of Yenisei. The Lena, draining about 700,000 sq. m., rises in the mountains N. of Lake Baikal, runs N. E. for half its course to Yakutsk, receives in lat. 63° the Aldan, its greatest tributary, and thence runs between masses of frozen mud, in which are found the remains of extinct species of the elephant and rhinoceros, falling into the ocean near lat. 73°, nearer to the pole than the mouth of any other great river. The Obi is the only Siberian river navigable for any distance; but, like all the others, it is frozen over for a great part of the year. 2. The Chinese river system comprises four minor divisions. The Hong-kiang or Si-kiang, rising in the province of Yun-nan, after an E. S. E. course of 1,000 m., falls into the bay of Canton. The Yang-tse-kiang descends in several streams from the Pe-ling mountains, which divide China proper from Tartary. Its length is nearly 3,000 m., a fifth part of which is navigable for large ships. In volume of water it is exceeded only by the Amazon and the Mississippi. It divides China proper into two nearly equal parts, passing through the most populous provinces. Its course is very winding, the general direction being first southeasterly and then northeasterly. It falls into the Yellow sea in lat. 32° N. The Hoang-ho or Yellow river, 2,500 m. long, has its source near that of the Yang-tse-kiang, but for a long distance the rivers are separated by mountain chains which border the table land. They then approach, and in 1851 their mouths were only 100 m. apart. In that year the Hoang-ho burst through its northern banks, and in 1853 its lower course had wholly changed, its present mouth in the gulf of Pe-chi-li being 260 m. N. of the former one. Nine similar changes are recorded within 2,500 years, the various mouths ranging over a coast line of nearly 350 m. Nearly all of the Chinese rivers are tributaries of these two great streams, the principal exceptions being the Hong-kiang and the Pei-ho or White river, which have their own basins. The Pei-ho, rising near the great wall, becomes navigable a few miles E. of Peking, and is an important channel for trade. It is also connected with the great canal. The Amoor, having its source in Mongolia, for a great part of its course separates Chinese Mantchooria from the Russian Amoor Country. Its lower course is wholly within the Russian dominions. Its length measured along its windings is nearly 2,400 m., or about 1,600 in a direct line. It falls into the sea of Okhotsk, in lat. 53°. 3. Of the Indo-Chinese system, the principal rivers are the Irrawaddy and the Salwen, which water Burmah; the

Menam, which traverses Siam; and the Mekong, or Cambodia, which flows through Anam. These rivers traverse regions little known. 4. The Brahmapootra and the Ganges form a double system. The Brahmapootra, according to the still doubtful assumption which makes the Dzang-botziu its upper course, rises in the lofty table land of Thibet, its head waters being not far from those of the Indus. After watering the long valley of Thibet, it makes a sudden bend to the south, cuts through the Himalaya chain near its E. end, and falls into the bay of Bengal, its waters near the mouth sometimes interlocking with those of the Ganges. The latter rises on the southern side of the Himalaya, and after running S. E. through the plains of Bengal, and receiving in its course 12 large rivers, falls into the bay of Bengal. The Brahmapootra and the Ganges drain an area of about 500,000 sq. m., and there is scarcely a spot in Bengal more than 20 m. distant from one of their tributary streams, navigable even in the dry season. 5. The Indus rises near the head waters of the Dzang-botziu, but breaks through the Himalayan chain toward the N. W. end, and after a course of 1,800 m. falls into the Arabian sea, on the opposite side of the peninsula of Hindostan. It drains about 350,000 sq. m. 6. The Euphrates and the Tigris, rising in the mountains of Armenia, flow for some distance close to each other, but after descending into the plain diverge to a distance of more than 100 m., again approach, and finally unite, falling into the Persian gulf under the name of the Shat-el-Arab. The region between them is the Mesopotamia of the ancients. The length of the Euphrates is about 1,800 m.; that of the Tigris, which pursues a more direct course, about 1,150. The basin of the Euphrates and Tigris occupies about 250,000 sq. m.—The lakes of Asia are of less importance than those of America or Africa. The Caspian and the Aral, however, commonly called seas, may more properly be regarded as lakes. The former, 700 m. long and 200 broad, lies 83½ ft. below the level of the Black sea. Although it receives the waters of the Volga, the largest river of Europe, it has no outlet, and its waters are salt. The Aral, 300 m. long and at its centre 150 broad, lies about 40 ft. above the same level; its waters are salt, but less so than those of the Caspian. It is probable that these two lakes were once united. Lake Baikal, in S. Siberia, has an area of about 13,000 sq. m., being, next after Superior, Michigan, and Huron, the largest body of fresh water on the globe, and lies about 1,400 ft. above the ocean level. Lake Balkash, or Tenghiz, 250 m. long and 70 broad, has an area of upward of 8,000 sq. m., approaching that of Erie. China has six considerable lakes, of which the two largest, Po-yang and Thung-thing, have each an area of about 3,000 sq. m., a third of that of Erie. The Tengrinoor in Thibet is of about the same dimensions. In Turkish Armenia is the great salt lake of Van. In Persia are the large salt lake of Urumiah, the small fresh-water lake of Hamun, and the little salt lake of Bakhtegan. Lake Asphaltites, or the Dead sea, in Palestine, is notable for its great depression and the exceeding saltness of its waters.—The proportion of Asia practically uninhabitable, either on account of extreme cold or the absence of water, is very great. A considerable part of Siberia lies north of the zone of cultivation. The great sand plain of Gobi, larger than France and England, is practically a desert. E. of the Caspian lies the large sandy desert of Khiva in Turkistan; and a still larger one occupies the centre of Iran. The great peninsula of Arabia is mainly a desert, which stretches northward and includes a considerable part of the plain of the Euphrates, having altogether an area of nearly 1,000,000 sq. m. Between the plains of Hindostan and the left bank of the Indus lies the Indian desert, 400 m. broad. Probably fully a quarter of Asia may be considered a desert region.—The climate of Asia embraces every general variety and every local incident: the rainless and riverless plains of Gobi, and the superabundant moisture of the Indian seacoast; the extremes of heat and cold in Siberia and the steppes; the more equable and agreeable climate of Asia Minor; gradations of temperature indicated both by a latitude ranging from the equator almost to the pole, and by a range of elevation from several hundred feet below the level of the sea to 29,000 feet above it. In no part of the earth's surface are the modifications of temperature, and consequently of products, more strongly marked; while in some spots the inhabitants behold at one view in their valleys and hillsides the animal and vegetable life of the tropics, of the temperate, and of the frigid zone. The vast plains of Siberia are exposed to the extremes of temperature. In Tobolsk the thermometer for weeks during the summer remains at from 80° to 90°, while the mean winter temperature is below zero. At Yakutsk the mean annual temperature is 13·43°, while in the summer it rises to 80°. The reason for this extreme variation is the distance of these plains from the ocean. The veil of mist which in more equable climates moderates the intensity of the rays of the summer sun is wanting; while in the winter no breeze laden with moisture is present to temper the extreme cold natural to the high latitude. The prevalent winds are from the southwest. These reach eastern Siberia after having traversed wide stretches of land covered with ice and snow, and being thus deprived of their caloric and moisture, they become cold land winds. This applies to the whole of Asia N. of lat. 35°. Compared with the maritime portions of Europe, the difference is striking. In Peking, lat. 39° 54′, the mean annual temperature is 9° lower than at Naples, which lies a little to the north; and 4·5° lower than at Copenhagen, which is 17° nearer the pole. The rain-

less plain of Gobi, just N. of and considerably less elevated than Thibet, is exposed to such extremes of temperature that only the hardiest shrubs can exist. The western plateau is also excessively cold in winter and excessively hot in summer. In northern India the great differences in elevation occasion great variations of climate within very moderate distances. Over an immense region one may pass in a single day through all the range of climates; torrid at the foot of the mountains, temperate on their sides, arctic at the top. In southern India regular rainy and dry seasons, occasioned by the monsoons, greatly modify the climate. The direction of the prevailing winds also affects the temperature. On the southern declivity of the Himalayas, in lat. 30° 45′, the snow line begins at the elevation of 12,982 ft.; on the northern declivity the warm winds from the Thibetan plateau raise the snow line to 16,630 ft.—Asia is rich in minerals. Gold is widely diffused in the Ural and Altai mountains, China, Persia, and Japan; silver in Siberia, Cochin China, and India; copper and iron in very many localities; mercury in China, Japan, and India. The island of Banca vies with Cornwall in the production of tin. Coal has been found in northern China and Japan; the area of its production is not ascertained. Petroleum, in its various forms, is abundant in parts of China and India, in Siam and the valley of the Euphrates, and on the shores of the Caspian. Salt is common all over the continent. Precious stones are more widely diffused in Asia than in any other part of the globe, every variety being found. The mines of India have produced nearly all the great diamonds discovered. The most valuable pearls are those found on the coasts of Ceylon and of the Persian gulf.—The geological features of Asia are considered under the special heads of the different countries and mountain ranges. The continent presents fewer traces than any other of volcanic action. Volcanoes are confined mainly to the peninsula of Kamtchatka, many of the mountains of which are only masses of lava. The peninsula of Cutch and the delta of the Indus present here and there traces of volcanic action, and are often agitated by subterranean forces. Mt. Ararat is also a volcanic peak. But the long line of islands forming a prolongation of the Asiatic continent is the great volcanic region; and the Japanese islands are also volcanic. The broken isthmus which connects the Indo-Chinese peninsula with Australia is a great line of fire. From Papua to Sumatra every large island is pierced with one or more volcanic outlets. Java has the largest number.—The flora of Asia, while in general similar to that of the other continents in corresponding latitudes, yet presents some peculiarities. Asia is especially the land of spices, odoriferous gums, and medicinal plants. North of the 60th parallel, the ground is perpetually frozen at a very small depth below the surface. Here and there trees are found as high as 70°; but for the most part the soil is covered with snow and ice for nine or ten months of the year. When this melts the plains are clothed with mosses and lichens, mixed with dwarf willows, and the swamps and morasses with coarse grass, sedges, and rushes. In the far north the plants live between the air and the earth, their tops scarcely rising above the soil, while their roots creep upon the very surface. The few woody plants trail along the ground, rarely rising an inch or two above it. The *salix lanata*, the giant of these miniature forests, never grows more than 5 inches high, while its stem, 10 or 12 feet long, lies hidden among the protecting moss. Somewhat further south, a beautiful flora makes its appearance in the brief hot summer. Potentillas, gentians, saxifrages, ranunculi, artemisias, and many others spring up, blossom, ripen their seed, and die in a few weeks. The Siberian steppes are bounded on the south by forests of pine, birch, and willow. The upper courses of the great rivers are bordered with poplars, elms, and maples. The Siberian pine, with edible seeds, reaches the height of 126 feet; the *pinus cembra* grows around Lake Baikal almost up to the line of perpetual snow. The greater part of Thibet is sterile. Frost begins early in September and continues till May. In some parts snow falls every month of the year. There are, however, many sheltered spots, heated by radiation from the bare mountain flanks, where grains and fruits of every kind flourish. Wheat, barley, buckwheat, and rice are native; maize has been introduced, and is successfully cultivated. There are olives, pears, apples, peaches, apricots, grapes, mulberries, and currants; the various species of melons are noteworthy for their quality and quantity. The Himalayan mountains form a distinct botanical district. Immediately below the snow line the vegetation is of an arctic character; lower down there are forests of pine, oak, walnut, and maple; the flowers are mainly species of rhododendron. At an altitude of about 5,000 feet the transition from a temperate to a tropical flora takes place. The transition zone lies between the 35th and 27th parallels of N. latitude, where the tropical flora becomes mixed with that of the temperate zone. The prevailing plants on the Chinese low grounds are glycine, hydrangea, camphor, laurel, the wax tree, clerodendron, rose of China, *thuja*, and *olea fragrans*, the flowers of which are used to flavor the finest teas. The India pride, paper mulberry, and other plants cover many of the hills. Of the tea plant there are two main species. The one, bearing small leaves, furnishes the tea consumed at home and exported to Europe and America; the other, with larger leaves, furnishes the brick tea consumed mainly in Thibet and N. E. Siberia; as used it is mixed with butter, forming a soup rather than a beverage. Rice is here the most important cereal. The plains of Hindostan are so completely sheltered

from the cold northern winds, and heated and watered by the monsoons, that the vegetation early assumes a tropical character. In the jungles among the lower ridges of the Himalaya ferns and orchidaceous plants abound. Trees of the fig tribe are a special characteristic. Some, as the banian, throw off shoots from their branches, which take root on reaching the ground, and become independent trunks, sending off other branches, which also take root, until a forest is formed around the parent stem. Palms of many kinds abound in India; of some species every part is useful to man. Cotton is of spontaneous growth. The native fruits of India are numerous. The orange, the plantain, the banana, the mango, and the date, areca, palmyra, and cocoanut palms, are all of Indian origin. The flowers are notable for their brilliancy of color. The island of Ceylon, which may be regarded as the southern extremity of the Indian peninsula, is the home of those species of laurel of which the bark constitutes cinnamon and cassia. The flora of Arabia is peculiar, being chiefly marked by the number of the plants producing odoriferous and medicinal gums. Oceans of barren sand, dotted here and there, wherever water is found, with oases, like islands, cover a great part of Arabia and the adjacent Syria. The prevalent vegetation consists of grasses growing under the shade of the date palms; while plants of the acacia tribe spring up scantily in the arid sand. Coffee, originally brought from Abyssinia to Arabia, has thence been widely diffused; the production in Arabia is small compared with the whole amount. The chief features of the Asiatic flora, excluding the arctic regions, may be thus summed up: The principal forest trees are aloes, bamboo, birch, chestnut, cypress, ebony, fir, gutta percha, ironwood, larch, mangrove, maple, myrtle, oak, palm, pine, poplar, rosewood, sandalwood, teak, and willow. The fruits are almond, apple, apricot, banana, banian, betel, cashew, citron, cocoa, date, fig, grape, guana, guava, lemon, lime, mangosteen, mulberry, olive, orange, pândanus, peach, pear, plantain, plum, pomegranate, shaddock, tamarind, and walnut. The most important spices and condiments are camphor, cassia, cinnamon, clove, mace, and nutmeg. The tea and coffee plants furnish the bulk of the non-alcoholic beverages of the world. The leguminous plants, such as the bean, pea, and lentil, present a great variety of species. The yam supplies the place of the potato. Cereals are widely diffused in their proper localities. Tobacco has been introduced, and is extensively cultivated. The sugar cane is indigenous. Hemp and flax are produced in large quantities. Among the native drugs are aloes, anise, camphor, datura, jalap, myrrh, opium, and sarsaparilla.—The zoölogy of Asia covers a wide field. It includes the whole class of domesticated animals. The ass, camel, goat, hog, horse, and ox came from Asia. Of the deer tribe there are many species, from the antelope to the reindeer. The Asiatic elephant differs considerably from its African congener. Besides some special anatomical peculiarities, it is distinguished by the smaller size of the ears and tusks, the latter being often entirely wanting. In Africa the elephant has probably never been domesticated; in Asia it has from time immemorial been made the servant of man in peace and war. Of oxen there are at least four distinct species: the Indian ox (*bos Indicus*), remarkable for its large hump, and held sacred by the Hindoos; the yak (*bos grunniens*) of central Asia, used as a beast of burden rather than of draught, notable for its silky tail; the buffalo (*bos bubalus*), often found wild, but capable of domestication; and the gayal (*bos gavæus*) of Indo-China. Among goats, that of Cashmere is famous for its silky hair, from which the costly shawls improperly styled camel's hair are made. Persia has a peculiar variety of sheep with a fatty tail. Many varieties of dogs exist; among the nobler species are the mastiff of Thibet, used for carrying burdens, and the Persian greyhound. Generally the dog is accounted an unclean animal, but a small species is fattened for food in China, the hams being considered a great delicacy. In India the pariah dog is the principal scavenger. Of the greater carnivora, the lion, leopard, and tiger are the chief. The Asiatic lion is smaller than the African, and lacks the flowing mane which forms the striking feature of the male of the African species. A species of leopard, the cheetah, has been partially tamed, and is used in hunting. The tiger is peculiar to Asia, abounding in the warm plains of the south and east, never crossing the deserts which separate India from Persia, but sometimes straying as far north as Siberia. Wolves and foxes are numerous in the colder, hyænas and jackals in the warmer regions. There are numerous species of bears; those of the cold regions are large and ferocious; those of the warmer parts are small and inoffensive, living mainly upon insects, fruits, and honey. Among about 422 species of quadrupeds found in Asia, 288 are stated to be peculiar to that continent. The tropical portions abound in monkeys, of which the species are numerous; some have long tails, some short ones, others none at all; but none have the prehensile tails of some American species. The birds of Asia include eagles, vultures, and falcons, of the predatory orders, with nearly all the varieties of game and domestic fowls, except the turkey. Lizards and other saurian reptiles are numerous in the rivers of the warmer parts of the continent; the gavial is the largest of its species. Pythons and other large serpents are found in the jungles. Of the larger venomous serpents, the cobra de capello is the most dreaded. Of fishes, the *salmonidæ* are abundant in the northern rivers, constituting the chief food of the natives and their train dogs. The

gold fish is a native of China. Of molluscous animals, the pearl oyster claims special notice, found chiefly in the Persian gulf and on the coasts of Ceylon.—Russian Asia includes the whole of the continent north of about 50°, with considerable southern extensions in the extreme east and in the west, reaching beyond 39°, the chief of which is a strip between the Black sea and the Caspian, including Caucasia and some territory acquired from Persia. Russia is slowly extending her domination among the independent tribes toward India, which it threatens to reach at no very distant date. Chiefly between lat. 50° and 40° lie Turkistan, Mongolia, and Mantchooria, inhabited by tribes which are more or less independent. Chiefly between lat. 40° and 30° lie Turkey, Persia, Afghanistan, and Thibet, with China at the east, extending southward to a little below 20°, and the main Japanese islands. Between lat. 30° and 20° lie Arabia, extending southward beyond 13°, southern Persia, Beloochistan, and the northern portions of Hindostan and Further India. South of lat. 20° are the main parts of the Indian peninsulas, the eastern including Burmah, Siam, and Anam, with the Malay peninsula, reaching southward almost to the equator.—The population of Asia is estimated at about 790,000,000, or nearly three fifths of the entire inhabitants of the globe. It is very unequally distributed over the continent. China proper and British India, with an area of less than 2,500,000 sq. m., have upward of 500,000,000; while Siberia, with about 5,000,000 sq. m., has less than 4,000,000. At least half the population of the globe is concentrated in China and India. Ethnologists usually group the inhabitants of Asia into three great classes: 1. The Mongolian race embraces almost all the peoples of the north, east, and southeast, including Siberia, Tartary, China, Thibet, and the Indo-Chinese peninsula, besides the dominant people of Turkey. But while the physical characteristics of the Chinese are similar to those of the Tartars, so great is the distinction between their languages that many have considered them as of a wholly distinct race. 2. The Aryan race embraces the main populations of Hindostan, Afghanistan, Beloochistan, Persia, and Caucasia, besides Russians, Greeks, Armenians, and others in Siberia, Turkey, and elsewhere. 3. The Semitic race includes the Syrians and Arabians, besides Jews in various parts. The Malay race appears on the continent only in the peninsula of Malacca. (See Ethnology.) Only a small part of the inhabitants of Asia can be properly designated as barbarous, for most of them have from time immemorial possessed a literature and established forms of government. Nor can they be called half civilized with much more propriety than the term might be applied to the ancient Egyptians, Assyrians, Greeks, and Romans. Their civilization, however, assumes a type presenting marked differences from that of Europe and America. Up to a certain point, and in certain directions, the Asiatics made great advances in every department of thought and culture; but that point once reached, the progress of development was checked. In China the laws, literature, art, and industry have remained almost fixed for ages. So, too, although in a somewhat less degree, in India. The changes which have been wrought have sprung from without, from the pressure of foreign races or the influence of a new religion, rather than from a principle of growth from within. Their very languages show a lack of progressiveness. The Chinese language now is the Chinese of 2,000 years ago. The Arabic of the Koran is the Arabic of to-day.—The religions of Asia fall mainly within three great classes: Buddhism in China and Japan, respectively modified by and mingled with Confucianism and Sintoism; Brahminism in India; and Mohammedanism existing in almost every region, but especially in the Turkish dominions, Persia, and the smaller states of western Asia. The pagans on the one hand, and the Christians and Jews on the other, are too few to be taken into the general account. The Greek church may nominally number 7,500,000, the Roman Catholic 4,500,000, the Protestant 500,000. Religion seems to be almost the only changeable thing in Asia. In two centuries Buddhism became the predominant religion of 300,000,000 people; in half that time Islamism spread from Arabia to Persia, Hindostan, and Tartary; and within a few years Babism, a new religion, has sprung up in western Asia, and is rapidly spreading in Persia, Turkey, and India. (See Babism.)—The political institutions of Asia present a variety of forms, among which the republican and constitutional are not to be found. Strict absolutism is the prevailing form. In many parts of Arabia and Tartary various nomadic tribes have a patriarchal government, under their own chiefs, although they nominally recognize a higher authority. In the true sense, only Turkey, Persia, Afghanistan, China, Japan, Burmah, Siam, and Anam can be called independent countries. All others are more or less dependent upon the great empires of Asia or Europe. In China the government is an absolute monarchy. More than a third of the continent is under the government of Russia and England. The most extraordinary foreign conquest is that by the British, which in a century and a quarter has made England mistress of more subjects than were ever ruled by any Roman emperor. Compared with the British possessions, those of the French in Cochin China and the Portuguese in India and at Macao in China are quite insignificant, while Holland and Spain possess only islands near the continent. Turkey should be considered an Asiatic power with possessions in Europe, rather than a European power with possessions in Asia. Great Britain, Russia, France, and Portugal

are therefore the only European powers who hold any portion of Asia. The principal political divisions of Asia may be classified as follows, placing the independent powers first in the order of their importance, and grouping some of the minor ones together: 1. China proper, with the islands of Formosa and Hainan. Chinese dependencies: Thibet, Chinese Tartary, Mongolia, Mantchooria, and Corea. 2. Turkey in Asia: Asia Minor, Turkish Armenia, Syria, Mesopotamia, Kurdistan, and part of Arabia. 3. Japan. 4. Persia. 5. Arabia. 6. Afghanistan, Herat, Beloochistan. 7. Further India: kingdoms of Anam, Burmah, and Siam. 8. Turkistan: khanates of Bokhara, Khiva, Kokan, and Koondooz. 9. Russian Asia: Siberia, Amoor Country, Russian Turkistan, Caucasia. 10. British India and native states under British influence. 11. French possessions: Cochin China, Pondicherry. 12. Portuguese possessions: Goa, Macao. Only roughly approximate statements of the area and population of most of these divisions can be given, for which reference is made to the separate articles upon them.—Asia is regarded as the birthplace of mankind. It is the cradle of all the great religious movements—of Hindoo pantheism and Buddhism, Hebrew monotheism and Persian dualism, Christianity and Mohammedanism—and the earliest seat of science and literature. Here flourished in hoary antiquity the secluded empire of China, and the Aryan communities which produced Zoroaster and the Vedas, and reared the stupendous monuments of Hindostan. Asia was the seat of the Assyrian, Chaldean, Median, Persian, Syrian, and Parthian empires. The names of Babylon and Nineveh, of Jerusalem, Sidon, Tyre, Palmyra, and Antioch, of Susa, Ecbatana, Persepolis, Ctesiphon, and Seleucia, of Sardis, Ephesus, and Miletus, keep before our minds the ancient glories of Asiatic power and culture; while in after ages Bagdad, Bassorah, Damascus, Aleppo, and even the distant Samarcand and Balkh in the wilds of central Asia, bespeak the progress of Asiatic civilization and intelligence. Phœnicia was the great teacher of Greece and the other countries bordering on the Mediterranean. When western civilization had been developed, Asia Minor was the theatre where Asia and Europe met. Persia and Hellas for a century and a half wrestled for supremacy, until semi-Hellenic Macedonia established her sway over both. The Seleucidæ of Syria became the successors of Alexander in the East, but finally yielded to the Parthians on one side and the Romans on the other. Rome extended her power to the Euphrates, and Asian Nicomedia was for a time a favorite seat of her emperors. In neighboring Nicæa Constantine had the dogmas of her new religion, received from Jerusalem, established. But Arabia produced a new faith and a new race of conquerors, and the caliphs triumphed over the Cæsars of the East, and restored power to its ancient seats on the Euphrates, Tigris, and Orontes. Reëstablished Persia was merged in their dominions. Sultan Mahmoud of Ghuzni conquered Afghanistan, and carried Mohammedanism beyond the Indus. In the west of Asia the cross, about a century later, began a deadly struggle with the crescent, which lasted for ages, and terminated with the total discomfiture of the crusaders. Turkish tribes, Seljuks and others, had in the meanwhile become the chief rulers of Moslem Asia. But now a vast human flood, under Genghis Khan, surged in from the plains of eastern Asia, overwhelmed China, India, and western Asia, and rolled on as far as the centre of Europe, thus renewing the devastations of the Huns and other northern Asiatic tribes who desolated the West-Roman empire before its fall. The Mongols retired from Germany, but their yoke remained firmly fixed on Russia, where the Golden Horde held sway for more than 200 years. In Bagdad they terminated the dynasty of the Abbasside caliphs. At the same epoch they established the successors of Genghis Khan on the throne of Afghanistan and northern India, and thus gave rise to the great empire of which Delhi afterward became the capital. The great body of the Mongols themselves embraced Buddhism. The Mongols of India adopted Mohammedanism. By the same irruptive movement, the native dynasty of the Chinese was displaced, and a Mongol line of sovereigns set up in their stead, of whom Kublai Khan was the first and ablest. The conquests of these fierce tribes, which had penetrated from the Chinese wall to Silesia and the shores of the Mediterranean, induced a feeling of terror in Christendom. Attempts were made by missionaries, sent into the heart of Asia, to establish friendly relations with the Mongols. Marco Polo also travelled in central Asia and Mongolia, and, after residing for a period at the court of Kublai Khan, the conqueror of China, brought home admirable accounts of central Asia, China, and India. The vast Mongolian empire of Genghis had, after a few generations, crumbled into pieces. The tribes from whom the guards of the throne and persons of the caliphs had been chosen had assumed the position of independent conquerors, and had founded the Ottoman empire. In 1299 Othman led his followers into the ancient province of Bithynia, nearly opposite Constantinople, and made Brusa his capital. Amurath and his son Bajazet soon overran the provinces of Asia Minor, and crossing into Europe possessed themselves of the Byzantine provinces. A new invasion of the Mongols under Tamerlane now swept over Asia and overthrew Bajazet (1402), but Amurath II. restored the Ottoman power, and his successor Mohammed II. established himself in Constantinople (1453). Under Solyman the Magnificent (1520–'66), the Ottoman empire reached its present limits, comprising Asia Minor, Syria, the country as far as the Tigris, and a part of Arabia. A quarter of a century after the permanent establish-

ment of Mohammedanism in Constantinople, Bernardo Diaz doubled the Cape of Good Hope (1486). Two years later Vasco da Gama arrived at Calicut, and afterward Almeida and Albuquerque were sent out and formed Portuguese settlements, Goa being captured and made their capital (1510). At this period China was in the hands of a Chinese dynasty, which had been established in 1358 by the extirpation of the Tartar rulers. In central Asia the thrones of Samarcand, Ispahan, Afghanistan, and Khorasan were filled by descendants of Genghis or Tamerlane. A number of petty chiefs maintained their independence; and the Uzbecks, the successors to the country of the Turks, harassed all the territories within their reach. In Persia the first of the Sufi dynasty had just ascended the throne. Albuquerque directed a successful expedition against Malacca, where he received the submission of Pegu and Siam. He also seized Ormuz at the mouth of the Persian gulf. A Portuguese embassy was sent to China, and the Portuguese having gained the favor of the court of Peking by extirpating a band of pirates that infested the coast, permission was given them to settle at Macao. From this point and from Goa they directed their operations, and in 50 years were masters of the Spice Islands, and monopolized the whole trade of the eastern ocean. The subjugation of northern India by the emperor Baber in 1526, and a succession of able princes, consolidated the empire of the Moguls in India. Abbas the Great, shah of Persia (1587–1628), raised the Persian empire to its highest pitch of modern greatness.—The brilliant successes of the Portuguese in India inspired adventurers of other nations with hopes of wealth. But it was not till 1600 that the English East India company was formed, and in 1612 English factories were established by leave of the native authorities at Surat, Ahmedabad, Cambay, and Gogo. In 1644 the native dynasty of the Chinese was terminated by the rebellion of the mandarin Li-tse-ching, and the Mantchoo Tartars again ruled the vast empire of China. About the same time the settlement of Madras was founded by the East India company, and subsequently the factory at Calcutta; and in 1661 the Portuguese ceded to the English the island of Bombay. The East India company, which had been unsuccessful as a trading undertaking, was reorganized, and in 1708 a new body of adventurers was formed, and admitted to a participation in its rights and privileges. This body was destined before the lapse of a century to acquire and consolidate a larger and more powerful empire than had ever been governed by the Moguls in India. Dutch and French trading companies had also obtained a footing in India. On the death of Aurungzebe in 1707, the affairs of the empire had rapidly fallen into confusion. The various rajahs became virtually independent, and the Mahrattas, who first appeared as freebooters during the reign of Aurungzebe, extended their dominions across the peninsula. In 1746, war having broken out between England and France, Labourdonnaie, the French governor of Mauritius, conducted an expedition against Madras, the chief British settlement in India, which capitulated on the understanding that it should be ransomed. Dupleix, governor of the French settlement of Pondicherry, conceived the scheme of consolidating the states of Hindostan into one mighty empire, and with the aid of native allies was at first successful against the English; but Clive saved the menaced existence of the East India company, and by 1760 the British had subdued the finest provinces of Bengal, Behar, and part of Orissa. From that time the limits of the British empire in India have steadily increased. A great revolt of the natives was put down in 1857–'8, and the government was immediately afterward transferred from the East India company directly to the crown.—In the north a few Cossacks brought Siberia under Russian dominion toward the close of the 16th century, and Peter the Great obtained a foothold in central Asia by assisting the shah of Persia against the Afghans. A plot concocted with Turkey for the dismemberment of the Persian kingdom was defeated by the energy of the usurper Nadir Shah, who for a brief space restored the waning glories of the Persian name, and passing the Indus pursued a career of conquest as far as Delhi. During his return he was murdered by mutineers (1747), and again the Persian empire was dismembered, Afghanistan being erected into an independent kingdom by Ahmed, one of Nadir's followers. The Russians have during the present century gradually extended their power, consolidating their rule over the Caucasian regions, and acquiring new possessions on the Aras, the Amoor, and the Jaxartes. Turkey has had conflicts with Russia, Persia, and her own vassal, Mehemet Ali of Egypt, but has escaped without a considerable loss of territory. Persia has been constantly declining, and has lately suffered a terrible depopulation from famine. China has been foreign enemies in her capital, and half her territory ravaged by a powerful insurrection. Japan has been compelled to open her ports and cities to the abhorred occidentals. Afghanistan has been torn by foreign and domestic wars. Arabia has witnessed the overthrow of the Wahabites, and several minor conflicts, but is on the whole as isolated and unsubdued as ever. What was formerly Independent Tartary is now half reduced by Russia. The political influences of Asia are balanced by British supremacy in the south and Russian in the north. These two great powers have long antagonized each other at the court of Persia, the key to central Asia and northern India. In China, Russian influence is perhaps greater than that of any other nation. In the west, Turkey keeps up the appearance of a great power, but her influence in general Asiatic affairs is a cipher.

ASIAGO, a town of N. E. Italy, in the province and 17 m. N. of Vicenza; pop. 5,140. It has manufactories of straw hats. Asiago is the foremost among the "seven German communities" of Venetia.

ASIA MINOR, a peninsula at the western extremity of Asia, forming a large part of Asiatic Turkey, between lat. 36° and 42° N. and lon. 26° and 41° E., and bounded N. W. by the Dardanelles (the Hellespont of the ancients), N. by the sea of Marmora (Propontis), the Bosporus, and the Black sea (Pontus Euxinus), E. by the Armenian mountains and their S. W. prolongations to the gulf of Iskanderun (of Issus), S. by the Mediterranean, and W. by the Archipelago (Ægean sea); area, about 212,000 sq. m. The eastern portion of the district consists of an elevated plateau from which rise mountain ranges of considerable height, among them the Taurus and Antitaurus (see TAURUS), culminating in the extinct volcano of Arjish Dagh (Argæus), about 13,000 ft. above the sea, and more than 9,000 above the plain. Between the abrupt edges of the high table land and the sea N. and S. of the peninsula intervenes only a narrow strip of low, level coast land. But on the west this strip is wider, forming an extensive and very fertile plain—that portion of the country to which the name of the Levant was several centuries ago first and properly applied, though the term has since been indefinitely used, often of the whole peninsula. The rivers are small; the chief are the Sakaria (Sangarius), Kizil Irmak (Halys), and Yeshil Irmak (Iris), which flow into the Black sea, and the Sarabat (Hermus) and Meinder (Mæander), which empty into the Archipelago. On the bar-

ren plateau the climate is dry and very hot in summer, but in winter cold; the N. and S. coasts are less subject to extremes of temperature; while the coast plain has one of the pleasantest climates in the world. The fruits of the fertile strip of land along the coast were celebrated in ancient times, and are still the most important productions of the country. —During the earliest period of its history Asia Minor appears to have been inhabited by a number of different tribes, and even by entirely different races. The names of these tribes gave rise to most of the designations afterward given to the divisions of the peninsula. The boundaries of these were not well defined until, under the successors of Alexander, they became separate states, generally under the rule of Macedonians and Greeks. The divisions on the N. coast were as follows: Bithynia, with the towns of Prusa (now Brusa), Nicomedia (Ismid), and Nicæa (Isnik), a country first inhabited by the Bebryces, a Mysian or Phrygian tribe, and afterward conquered by the Bithyni, who, according to Herodotus, came from Thrace; Paphlagonia, with its chief city Sinope (founded by a Greek colony), named from the Paphlagonians, from whom it was conquered by the Lydians, after which it was ruled successively by Persians, Macedonians, and Greeks; and finally Pontus, with Trapezus (Trebizond), first occupied by savage tribes of which little is known, then colonized by the Greeks, and afterward the kingdom of the famous Mithridates. On the W. coast

were three other divisions: Mysia, including the plain of Troy and the royal city of Pergamus, in the district of Teuthrania; Lydia (capital, Sardis), whose founders, the Lydians, were probably a Semitic people, who established the first enduring empire of which we have authentic record in Asia Minor; and Caria, settled, according to Herodotus, by colonists from the islands of the Ægean. On the W. coast also, and within the boundaries of the three divisions just named, were the famous Greek colonies of Æolis, lying principally in S. W. Mysia, Doris in southern Caria, and between the two Ionia, with its confederation of twelve cities (Phocæa, Smyrna, Ephesus, Miletus, &c.), peopled by Greek colonists, according to tradition emigrants from Attica in the obscure time of Codrus, who here maintained the reputation of their race for progress and civilization. On the S. coast were Lycia; Pamphylia, so called from the number of tribes composing its inhabitants (Πάμφυλοι, people of all races); Pisidia, parallel with and just N. of the narrow coast strip of Pamphylia; and Cilicia, with the city of Tarsus, in ancient times peopled by the most formidable pirates of the East. The inland districts were Phrygia, whose inhabitants claimed to be autochthonous; Galatia, named after the Gauls who deserted the army of the later Brennus to settle here; Cappadocia (capital, Mazaca, now Kaisariyeh), first ruled by the Medes, afterward by the Persians; Isauria, peopled by a tribe of mountaineers dreaded as daring robbers; and Lycaonia, first mentioned by Xenophon, and inhabited by an ancient tribe from whom it took its name.—In reviewing its history Asia Minor cannot be treated as a united whole; for details concerning its different divisions the titles just given are referred to. The following outline, however, may serve to show how inextricably its fortunes are complicated with those of the great nations which for 3,000 years contended for its dominion. Though the traditions regarding its first settlement are obscure, it appears that the Lydians, coming from the east, were among the first inhabitants of the country. Their government is at all events the first of which we have any detailed record. It flourished until King Crœsus was defeated by Cyrus, and the Persian empire gained the dominion of the peninsula, holding it from about 554 to 333 B. C. The campaign which in the last-mentioned year ended with the battle of Issus now added the country to the conquests of Alexander. It remained under his various successors until the victories of L. Scipio (190) and Manlius (189), followed by the treaty with Antiochus in 188, the bequest of the kingdom of Pergamus to Rome by Attalus III. (133), and the overthrow of Mithridates (65 B. C.) gave the territory to the Romans, in whose hands, and those of their followers of the Byzantine empire, it continued till its conquest by the Turks in the 13th century.—Asia Minor now forms a part of Turkey in Asia; its larger portion constitutes the district called Anatolia, or Natolia, from the old Greek name given to Asia Minor—Ἀνατολή, the east or land of the rising sun. Officially, it includes several eyalets, but the name Anatolia is generally applied to the whole region. For details as to its present condition, see TURKEY.

ASINAIS, a tribe of Indians on Trinity river, Texas, frequently mentioned in accounts of La Salle's expedition and early Louisiana history under the name of Cenis. They were a branch of the confederation known as the Texas, were sedentary, cultivating rudely maize, beans, squashes, melons, and tobacco, and making mats and earthenware. They lived in large beehive-shaped cabins, each holding 15 or 20 families, and at a very early day procured horses from the Spaniards to use in war and hunting. La Salle visited them in 1686, and the French subsequently, under La Harpe and St. Denis, tried to gain them; but the Spaniards established missions and posts among them in 1715. Before the close of the century they ceased to be noticed as a separate tribe, and are now apparently extinct, unless they are represented by the Arapahoes.

ASKEW, Ascough, or Ayscough, Anne, an English Protestant lady, a native of Lincolnshire, who was burned at Smithfield, July 16, 1546. Her husband, named Kyme, was a strong Catholic, and turned her out of doors because she embraced the principles of the reformers. She went to London to sue for a separation, and attracted the sympathy of the queen, Catharine Parr, and many of the court ladies. Her denial of the corporeal presence of Christ's body in the eucharist caused her arrest and committal to prison. Burnet says that after much pains she signed a recantation, but this did not save her. She was recommitted to Newgate, and asked to disclose who were her correspondents at court. She refused to reply, though she was racked in the presence of the lord chancellor. As she was not able to stand after the torture, she was carried in a chair to the stake, and suffered along with four others, undergoing this last trial with signal fortitude.

ASMANNSHAUSEN, a village of Prussia, province of Hesse-Nassau, on the right bank of the Rhine, 2 m. below Rüdesheim; pop. about 600. It is famous for the wine of Asmannshausen, one of the best red Rhenish wines.

ASMODÆUS, or **Asmodi** (Heb. *Ashmedai*, from *shamad*, to destroy), an evil demon mentioned in the later Jewish writers. In the book of Tobit he is described as murdering the seven husbands of Sarah, one after the other. In consequence of this he has been facetiously termed the evil spirit of marriage, or the demon of divorce. In the Talmud he figures as the prince of demons, and is said to have driven Solomon out of his kingdom. Tobit got rid of him by prayer and fasting. Asmodæus is the hero of Le Sage's novel *Le diable boîteux.*

ASMONEANS, or **Hasmoneans** (Heb. *'Hashmonaim*), the name of a Jewish priestly family

which, under its founder Mattathias, the great-grandson of Asmonæus, and his five sons, liberated Judea from the yoke of Antiochus Epiphanes and his successors, and subsequently held both the high-priestly and the princely dignity, until supplanted by Herod. They are also known, though not properly, as Maccabees. Mattathias raised the standard of revolt in 167 B. C., dying soon after. His fifth son Jonathan, and his grandson John Hyrcanus, fully established the independence of the country; and the son of the latter, Aristobulus I., assumed the royal title (106). The rivalry of Hyrcanus II. and his brother Aristobulus II., nephew of Aristobulus I., brought about the intervention of Rome, and the disguised subjection to her under Herod. Antigonus, the son of Aristobulus, who was the last to fight for the rights of his house, perished by the hand of the Romans (37), and Herod successively extirpated the rest of the house, including his own wife Mariamne and his two sons by her. (See HEBREWS.)

ASNIÈRES, a village of France, in the department of the Seine, on the railroad from Paris to St. Germain, nearly 4 m. N. W. of Paris; pop. in 1866, 5,455. The kings of France formerly had a castle here. The place, with its surroundings, was very conspicuous in the fights of the Paris communists with the government troops in the early days of April, 1871.

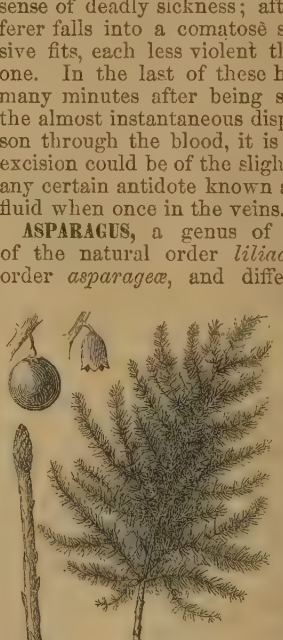
ASOPUS. **I.** A river of Bœotia, now called the Oropo. It rises about 6 m. N. N. of Mt. Elatea (anc. *Cithæron*), flows E. through Bœotia, and empties into the channel of Egripo in the territory of Attica, near the town of Oropus; length about 25 m. **II.** A river of Peloponnesus, now called the Hagios Georgios (St. George). It flows from the mountains S. of Phlius N. E. through Argolis into the bay of Corinth. **III.** A river god, identified in legend with each of the above described rivers. The legends connecting him with the Asopus in Peloponnesus trace his descent from Neptune. He married Metope, daughter of Ladon, and by her had two sons and twelve or twenty daughters. Jupiter bore off his daughter Ægina, whereupon Asopus revolted, but was struck by a thunderbolt and reduced to submission.

ASP, a name given to more than one species of the venomous serpents. By naturalists it is confined to the *vipera aspis* (Schl.), which is a native of the European Alps. The historical asp, with which Cleopatra is believed to have destroyed herself after the death of Antony, is generally supposed to have been the *cerastes Hasselquistii.* From many circumstances, however, and more especially from the description of Pliny, it is evident that the asp of the Roman writers generally, and therefore doubtless the asp of Cleopatra, is the common and celebrated Egyptian species, the *naya haye* of the modern Arabs. This reptile was chosen by the ancient Egyptians as the emblem of the good deity, Cneph, and as the mark of regal dignity. It is closely allied with the cobra de capello, *naia tripudians*, called *nâg* by the Hindoos, which is still worshipped in some of the temples in India. The Hindoos believe

Asp.

that, in sagacity and its malicious tenacity in treasuring up a wrong to avenge it, this serpent is in no wise inferior to a man. The *naya* is of a dark greenish hue marked with brownish; is hooded like the cobra when it expands itself in rage, but wants the peculiar mark on the back of the neck which characterizes the Asiatic species, and which has been compared to a pair of spectacles. It varies in length from three to five feet, and is one of the deadliest serpents known. The bite produces acute local pain in the first instance; then a sense of deadly sickness; after which the sufferer falls into a comatose state, with convulsive fits, each less violent than the preceding one. In the last of these he dies, usually not many minutes after being struck. Owing to the almost instantaneous dispersion of the poison through the blood, it is not believed that excision could be of the slightest utility; nor is any certain antidote known against the deadly fluid when once in the veins.

ASPARAGUS, a genus of perennial plants, of the natural order *liliaceæ* and the suborder *asparageæ*, and differing only in the fruit from the *asphodeleæ*. The genus is distinguished by tuberous root stocks, branching stems, thread-like leaves, jointed pedicels, a 6-parted perianth, small greenish-yellow or white flowers, and a spherical berry. It embraces 26 species, many of which become hardy shrubs, and climb with their spiny branches as if by tendrils. A few of them are common in the East Indies and around the Mediterranean; most



Common Asparagus (Asparagus officinalis). Root, Fruit, Flower, Shoot, and Mature Sprig.

of them are rare and of little importance, and none are natives of America. Of the wild species, the most widely spread are the *A. acutifolius* and *albus*, the needle-leaved and the white, the former of which is common in France, Spain, Barbary, and the Levant; the latter is found in the same countries, France excepted, and is remarkable for its white flexuous boughs and green caducous leaves; the young shoots of both are eaten by the Arabs and Moors. The best known member of the genus is *A. officinalis*, the common or garden asparagus, esteemed as a delicate culinary herb from the time of the ancient Greeks. It is thought to be native both on the shores of England and in rocky and sterile districts in Europe and Asia, and when it has attained its full development is an elegant plant, from 3 to 4 feet high, with numerous branches loaded with fine and delicate leaves, and covered with small, greenish-yellow, bell-shaped, and almost solitary flowers. The young and tender shoots of the plant, cut when but a few inches from the ground, before ramification, are served for the table. It loves a dry, deep, and powerfully manured soil, and is raised from seeds either planted in seed beds in the spring and transplanted the next year, or planted at first where they are to remain. During the first two years the young heads should not be cut; half of them may be cut in the third, and after that the full crop. The supply will begin to diminish after 10 or 12 years. The beds for asparagus are usually about 4 feet broad, and should be manured and trenched at least 2½ feet deep. The plants are in rows about a foot apart, and are thinned out till they stand about 6 inches from each other in the row, and in growing a cluster of heads branch from each root. The crop may be reaped as often as it appears, being cut from a little below the surface of the ground; yet the plant degenerates by being cut late in the season. The bed should be annually, in the autumn, replenished with manure, dug in between the rows as deeply as possible without injuring the roots, and covered with pulverized manure, seaweed, or other litter during the winter, as a protection from the frost. Asparagus is easily forced by the use of hotbeds, but the process of transplanting always injures or destroys the roots; and if, instead of transplanting, the bed be covered and the trenches filled with hot dung, which mode is sufficient to forward the crop one or two weeks, care must be taken to give the plants time to rest and recover in the later part of the season.

ASPASIA, a Milesian woman who fixed her residence at Athens about the middle of the 5th century B. C. By her great eloquence, political and literary ability, and personal fascination, she at once obtained a commanding position among the leaders of the state, and gained the affection of Pericles so far that he separated himself from his wife and made Aspasia his consort as well in private life as in political affairs. The fact that the laws of Athens conferred no rights upon foreign women, and allowed no actually legitimate marriage with them, has given rise to the impression that Aspasia was a courtesan. The many enemies of Pericles, especially the satirists of the time, also conveyed this idea by their attacks, but it seems to have been without foundation; she was held in universal esteem, and her union with Pericles was as close as the Athenian law allowed, and continued through his life. The enemies of Pericles attributed to her influence the outbreak of the war with Samos and of the Peloponnesian war; but the best historians deny this. She is also said with obvious exaggeration to have instructed Pericles in oratory; but it is certain that she assisted him greatly in the government, and that her own eloquence was remarkable. When the Athenians named Pericles the Olympian Zeus, Aspasia was called Hera (Juno). Her house was the resort of all the leading statesmen and philosophers of Athens; and in many of their works her great abilities are celebrated. After the death of Pericles (429) she attached herself to a cattle dealer named Lysicles, whom she instructed in oratory and by her influence raised in position. Her son by Pericles took his father's name, being legitimated by a popular decree, and became a general of high rank. He was put to death with five others in consequence of the unsuccessful result of the battle of Arginusæ (406).

ASPEN. See POPLAR.

ASPERN AND ESSLING, two villages lying about a league apart, on the N. side of the Danube, a short distance below Vienna, which were the principal strategic points in a desperate battle to which they have given a name, fought May 21 and 22, 1809, between Napoleon's army and the Austrians under the archduke Charles. The Austrians attacked while the two bodies of the French force were separated by the river, inflicting a severe defeat, and finally compelling Napoleon to retreat to the island of Lobau. Masséna, who secured the retreat by the defence of Essling, received from it his title of duke of Essling. The Austrian loss was 4,000 killed and 16,000 wounded; Napoleon's loss 8,000 killed and 30,000 wounded. Marshal Lannes was among the mortally wounded. The success of the Austrians was more than counterbalanced soon after by their defeat at Wagram (July 5, 6).

ASPHALTITES LACUS. See DEAD SEA.

ASPHALTUM, or **Asphalt** (Gr. *ἄσφαλτος*), a mixture of different hydrocarbons, some of which contain oxygen, by the majority of chemists and geologists supposed to be of vegetable origin, while others derive it from the remains of animals. It is also called bitumen, mineral pitch, and Jews' pitch (from Lacus Asphaltites). (See BITUMEN.) It is more bituminous than the coals, and when pure is of the consistence of resin; but the consistence varies with the temperature and with the amount of liquid bitumen or petroleum which may be mixed with it, holding the more solid asphaltum in solution. It

is often intermixed with stony substances, and sometimes even contains 80 per cent. of carbonate of lime. Pure asphaltum is soluble in oil of turpentine, naphtha, and carbonates of the alkalis, but insoluble in water; alcohol dissolves out of it about 5 per cent. of a resinous substance, and ether takes up 20 per cent. of another resin that is not affected by the alcohol. It yields also a volatile oil. The remainder is a substance named by M. Boussingault *asphaltene*, the composition of which is $C_{20}H_{16}O_3$. Asphaltum burns readily, with a red smoky flame, and leaves no ashes except those due to its impurities. Its specific gravity ranges from 1 to 1·8; its color is black and dark brown, and it does not soil the fingers. It melts at the temperature of boiling water, and consequently is unfit for use as fuel, and cannot be economically used for gas. Most of the geological formations contain it, but it is particularly common in the secondary and tertiary calcareous and sandy strata. In the primary rocks it is found only in small veins. It is obtained in large quantities on the shores of the Dead sea, rising to the surface, where it forms solid lumps which are thrown on the shore. Some of the other noted localities are a lake on the island of Trinidad, 1½ m. in circumference, which is hot at the centre, but is solid and cold toward the shores, and has its borders over a breadth of three fourths of a mile covered with the hardened pitch, with trees flourishing over it. The inhabitants powder the asphaltum and drive it by a blast upon burning coals; thus used it gives out as much heat as an equal weight of the best English coal. It is thrown over bagasse or wood fuel in the manufacture of sugar. At various places in South America are similar lakes, as at Caxatambo and Berengela, Peru, where it is used for pitching boats; in California, near the coast of Santa Barbara. It occurs in smaller quantities, disseminated through shale and sandstone rocks, and occasionally limestones, or collected in cavities or seams in these rocks, in Derbyshire, Cornwall, and the French department of Landes; and at Val de Travers, Neufchâtel, impregnating a bed in the cretaceous formation, and serving as a cement to the rock, which is used for buildings. Grahamite from West Virginia, described by Prof. Wurtz of New York in 1865, resembles asphaltum in its pitch-black lustrous appearance.—A rigorous analysis applicable to all asphaltum cannot be given, as each bed may present different results. The following ultimate analyses have been made:

	Carbon.	Hydrogen.	Oxygen.	Nitrogen.	Ash.
1. Bastennes,	78·50	8·80	2·60	1·65	8·45
2. Auvergne,	77·64	7·86	8·35	1·02	5·13
3. Cuba,	82·34	9·10	6·25	1·91	0·40

Nos. 1 and 2 were by Ebelman, No. 3 by Wetherill. The action of heat, alcohol, ether, naphtha, and oil of turpentine, as well as the above analyses, show that the so-called asphaltum from different localities is very various in composition, and that the true composition of any one of them is not known. They contain volatile oils, heavy oils, resins soluble in alcohol, solids soluble in ether but not in alcohol, other solids not soluble either in alcohol or ether, and nitrogenous substances.—Asphaltum was used by the ancient Egyptians in embalming, and appears to have been employed in the construction of the walls of Babylon. It is now used for pavement, for making water-tight tanks, as a coating for tubes of glass and iron used for conveying gas or water, and for various other purposes of like nature. Asphalt is used in Paris in two different forms: first, the natural rock, unalloyed, with which streets are paved; second, a mixture of asphalt with bitumen and fine gravel for the construction of sidewalks. The rock is found principally at Seyssel and Val de Travers, and is transported to Paris by canal and rail. Pure asphaltic rock is preferred for streets and roads. When this is heated to near 300° F., it crumbles to a mass of brown powder, which when compressed in a mould and allowed to cool recovers its original hardness and appearance. If the hot powder, instead of being placed in a mould, be spread about two inches thick on a hard foundation and pressed or packed by a hot iron pestle or roller and allowed to cool, the surface will immediately solidify, forming a crust identical with the original rock. The discovery of this application was due to accident. Fragments of asphaltum, dropping from the carts which transported it from the quarries along the road, became heated by the sun and were crushed to powder and compacted by the continual passage of carts, until they formed a hard, smooth track. The matter was investigated, and led to the present method of asphaltum road making. The sidewalks of Paris are made of mastic of asphaltum, with an addition of bitumen and fine gravel, and can be more properly described under PAVEMENT.—**Artificial Asphaltum** is made from bitumen or the refuse tar of the gas house. Coal tar is heated to a degree that renders it hard and brittle; of this 25 parts are mixed with 50 parts slaked lime in fine powder and 75 parts river gravel. These ingredients are thoroughly incorporated in a cast-iron boiler, heated for two hours, and drawn off into moulds. The blocks thus obtained are treated subsequently like mastic of asphalt for sidewalks, except that the temperature is carried higher. Another patent gives the following proportions: Residue of tar containing considerable non-volatile oil, 25 to 50 per cent.; carbonate of lime in dry powder, 50 per cent.; silica and clay, 25 per cent. This is stirred in a boiler over a slow fire for ten hours and run off into moulds. The mineral constituents must be previously strongly heated to expel air and moisture, in order to facilitate the thorough incorporation with the pitch. Artificial asphaltum is used for coating gas pipes to protect them from corrosion; also for sidewalks, roofing, flooring, especially for

stables, and water-tight tanks. A concrete prepared of 95 lbs. asphaltum, 5 lbs. bitumen, and 150 lbs. broken stone, has been employed in France for marine constructions. The use of prepared asphaltum in the United States has been largely increased since the discovery of petroleum and of a deposit of a solid hydrocarbon called Grahamite, and also in consequence of the great extension of gas manufacture by which the supply of raw material has become practically inexhaustible.

ASPHODEL (*asphodelus*), a genus of ornamental perennial plants belonging to the natural order *liliaceæ*, and to the sub-order *asphodeleæ*. They are all natives of the old world, and are found abundantly in Greece, Sicily, Asia, and Barbary. The genus comprises 12 species, all of which have a bulbous root, erect undivided stem, long leaves, and showy flowers arranged in clusters, which in most of the species are spikes. The *luteus*, or common yellow species, is an old inhabitant of European gardens, into which it was introduced from the shores of the Mediterranean. It is branchless, about 2½ feet high, has scattered and almost piliform leaves sheathing the stalk, and flowers of a beautiful golden yellow. It blossoms during six weeks in midsummer. The *ramosus*, or white and branched asphodel, has a naked stem with ramifications near the summit, each of which is terminated by a spike of white star-shaped flowers having their petals streaked with purple. The ancients had a superstition that the manes of the dead were nourished upon its roots, and they therefore planted it in the neighborhood of sepulchres, and made it sacred to Proserpine. It still covers the hills and valleys of Apulia, where it furnishes nourishment to the sheep. The *albus*, or upright asphodel, differs from the preceding by having a branchless stem, and also by having its flowers a little smaller and nearer together. The other species of asphodel are much less frequently cultivated in gardens.

Asphodelus ramosus.

ASPHYXIA (Gr. *ἀσφυξία*, from *ἀ* privative and *σφύξις*, pulse), literally, a temporary or a final suspension of the motion of the heart, and the pulsation of the arteries. The word is now used exclusively to signify a condition of imperfect or suspended respiration, in which the blood is no longer arterialized by the influence of the air, irrespective of the motion of the heart, which may continue some time after respiration ceases. The immediate baneful effects of the suspension of respiration arise from the privation of oxygen, and from the retention of the carbonic acid previously formed, which becomes a blood poison. If the circulation be disproportionately augmented, carbonic acid is formed, and being morbidly retained, convulsion and death ensue. If the respiration is unduly and disproportionately augmented, the subject is cooled, for mere pulmonary respiration is a cooling process, by the difference of temperature of the inspired and expired air; and in this case also the subject dies, but now from loss of temperature. This latter is the case in the asphyxiated patient, if the respiratory movements be unduly hastened. On the other hand, if in the asphyxiated we excite the circulation, without simultaneously and proportionately inducing the respiratory movements, we destroy the patient by carbonic acid, formed in the course of that circulation, and uneliminated by respiration. This statement explains the injurious and fatal tendency of the warm bath which was formerly recommended in asphyxia, for it is injurious, and has doubtless of itself proved fatal in cases in which the patient without it would have spontaneously recovered.

ASPINWALL, or **Colon,** a city and seaport of the United States of Colombia, the Atlantic terminus of the Panama railway, situated on the island of Manzanilla in Limon or Navy bay, in lat. 9° 21′ 23″ N., lon. 79° 53′ 52″ W., 47 m. by rail N. N. W. of Panama; pop. in 1872, about 6,500. The island of Manzanilla (area, 650 acres) was in 1852 ceded to the railway company for ever. The harbor of Aspinwall is one of the best on the coast. The town was founded by the railway company in 1850, and was originally intended to serve merely as a port of transit; but it has become a centre of supply for many neighboring towns. The office and freight depot of the railway company, the former of brick and the latter a massive stone structure 300 by 80 ft., are the only edifices worthy of note. The railway company's wharf, 40 ft. wide, extends out from the shore upon a coral reef nearly 1,000 ft. The former insalubrity of the place has been in great part remedied by raising its level and by thorough drainage. The port is now (1872) visited monthly by three steamers from New York, four from English, two from German, and two from French ports.

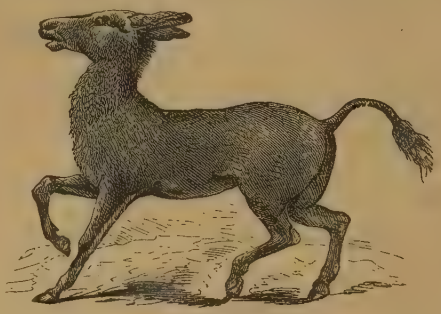
ASPLAND, Robert, an English dissenting minister, born in Cambridgeshire, Jan. 23, 1782, died Dec. 30, 1845. In 1799 he entered the university of Aberdeen, but in the following year he resigned his scholarship on account of the change in his theological opinions, which prevented him from remaining longer a beneficiary upon a Calvinistic endowment. For a year or two he tried to occupy himself with trade, but he soon resumed his theological pursuits, and in 1801 was ordained pastor of the General Baptist congregation at Newport, Isle of Wight, with liberty to preach Unitarian

doctrines. He was then not 20 years old. In 1805 he was installed pastor of the Gravel Pit chapel, Hackney, where he continued until his death. Mr. Aspland stood for years at the head of the active Unitarian clergy of England. In 1806 he established a religious magazine, the "Monthly Repository," and took the lead in founding the Unitarian fund society for the support of popular preaching and the relief of indigent ministers. In 1815 he established the "Christian Reformer," a monthly magazine of considerable influence. The list of his publications numbers 50, and since his death a volume of sermons and several pamphlets from his pen have been edited by his son.

ASPROMONTE, a mountain in the S. W. corner of Italy, near Reggio, celebrated for the battle of Aug. 28, 1862, between the Italian troops under Pallavicini and the volunteers of Garibaldi. The latter, who had crossed over from Sicily to march on Rome, against the warnings of the royal government, was defeated, wounded in the foot, and taken prisoner with the larger portion of his men.

ASPROPOTAMO. See Achelous.

ASS (*equus asinus*), the humblest member of the horse family, known to be of eastern origin. He is first mentioned in Genesis, in the history of Abraham, who, when he went down to Egypt on account of the famine in Palestine, found that Pharaoh was possessed of "sheep, and oxen, and he asses, and man servants, and maid servants, and she asses, and camels." At that time, probably, as was the case during all the historic ages of Greece, a species of ass was wild on the mountains of Syria, Asia Minor, and throughout Persia; and in the latter country and Armenia, in the region about the sources of the Tigris and the Euphrates, and the shores of Lake Van, it exists in a state of nature to the present day. Asses are mentioned in Xenophon's Anabasis as occurring in great numbers in parts of Mesopotamia. These animals, which he simply terms wild asses (ὄνοι ἄγριοι, of which words the specific Latin name *onager* is merely a corruption), were in company with ostriches, antelopes, and bustards; they were eagerly pursued by the horsemen of the army, and are described as being possessed of extraordinary speed and endurance. The wild asses of the same country are still possessed of the same characteristics. They have always been the special quarry of the Persian monarchs, and Nadir Shah was indefatigable in his pursuit of them, and considered the running down of one with his greyhound a feat equal to the winning of a battle or conquering a province. The flesh was considered the most exquisite of venison. The wild ass of Xenophon, and that, probably identical with it, hunted by the shahs of Persia, is presumably the dziggetai, or *equus hemionus* of Pallas, which, as its specific name (*hemionus*, half-ass) indicates, possesses as much of the horse as of the ass in its character and qualities. The best breed of ass comes from the East, where he has been long carefully cultivated as a saddle animal. The rocky nature of the soil and mountainous face of the country in Palestine favored the employment of this



Wild Ass (Dzĭggetai).

hard-hoofed, sure-footed, patient, and enduring animal, as much as it discouraged that of the delicate, fine-limbed, high-bred courser of Syria and Arabia. Lieut. Col. Smith, who has devoted much attention to the equine families of the East, found near Bassorah a breed of white asses, remarkable for their excellence, which he had reason to believe are of a breed as ancient as the time of the kings of Judah.—The characteristics of the ass, as distinguishing him from the horse, are: 1, inferiority in size, although doubtless this in European countries is in great part in consequence of centuries of cruel treatment, scanty fare, and want

Ass (Asinus vulgaris).

of attention in breeding, the animal having been for ages regarded only as the drudge of the poor; 2, a rougher and more shaggy coat, capable, however, of much improvement by warm keeping and a little grooming; 3, the shortness and stiffness of his pastern joints, and the hard solidity of his sound upright hoofs, which seem almost incapable of lameness, and render him the safest and most sure-footed of animals in difficult mountain passes; 4, the extraordinary length of his ears, resembling those of the hare more than those of his own race; 5, the peculiar cross which he bears on his back, formed by a longitudinal dark stripe along the course of the spine, and a transverse bar across the shoulders, which in-

dicates his family connection with the untamable members of his race, the zebra and quagga, who are yet more conspicuously striped, and of whose character and disposition the ass possesses many points. The usual color of the ass is gray, mouse-colored, or black; and as he tends to bay, dun, or chestnut, the horse colors, the quality deteriorates. The dental system of the ass assimilates that of the horse, and in like manner indicates the age of the animal by the changes and marks of the teeth. The male ass is capable of propagation at two years, the female somewhat earlier; the latter carries her foal 11 months, producing it in the beginning of the 12th. The sexual vigor in both sexes is excessive, which may explain the fact that in the hybrids of the ass and horse the offspring are much nearer, as well in organization as in temper and appearance, to the former than to the latter progenitor. In all cases the mule is an ass modified by a strain of the horse; not a horse modified by a cross with the ass. The hybrid foal of the male ass and the mare is the true mule; that of the stallion and the she ass, the hinny—the latter being less strongly tinctured with the blood and having less of the form of the ass, owing to the superior influence of the male in the physical form and external organization of the progeny. The mule, like the ass, brays, owing to a peculiar construction of the larynx; while the hinny neighs, like its sire.—There is no doubt but that with careful breeding, grooming, stabling, and nutritious feeding, the ass might be improved at least as much as any other domestic animal. As it is, he is admirably adapted for a beast of burden in cold, mountainous countries, in which, on a quarter of the food required by a horse, he will safely carry burdens under which the more generous animal would break down, over places in which the other could not keep its footing. Under kind treatment, he is hardly inferior in docility to the horse or the dog. The female is excessively fond of her young, and both sexes are susceptible of strong attachment to their owner. In elevated countries, where the soil is light, asses are serviceable in an agricultural point of view; although in the United States, to which they were first introduced by Gen. Washington, they are little used except for the propagation of mules. The best asses are obtained either from Smyrna, the island of Cyprus, or from Spain, where the race has been particularly cultivated, as it has also in Peru, with a view to the business of mule-raising, which in both these countries is important.

ASSAB, or **Saba**, a bay in the Red sea, on the coast of Africa, 40 m. N. W. of the strait of Bab-el-Mandeb, in lat. 12° 55′ N., lon. 42° 45′ E., 16 m. long and 5 m. wide. It is bordered on the W. by high table land, and in its front are the coral islands of Darmabah and Darmahië, the last forming near Cape Luma a safe harbor for small craft. The neighboring inhabitants are the Danakil, who are virtually governed by their own sultan, though the khedive of Egypt claims to be their legitimate ruler. The bay of Assab was purchased in 1869 by an Italian steamboat company as a coaling station on the voyage from Italy to Egypt through the Suez canal to India.

ASSAM, a province at the N. E. extremity of British India, presidency of Bengal, between lat. 25° 50′ and 28° 20′ N., lon. 90° 40′ and 97° 30′ E., bounded N. by Bhotan and Thibet, N. E. by Thibet, E. and S. by Burmah, and S. W. by Bengal; area, 21,800 sq. m.; pop. variously estimated at from 200,000 to 700,000, the smaller number being probably more nearly correct. The country lies between two mountain ranges, branches of the Himalaya, which are joined at its eastern end, and rise both on its northern and southern side to the height of nearly 20,000 feet. These send out offshoots along the sides of the valley which forms the province, and which consists of a long and level plain, studded here and there with groups of hills. The number of considerable streams exceeds 60, so that Assam is supposed to contain more rivers than any other equal extent of territory in the world. The Brahmapootra is the chief of these, flowing through the centre of the country from E. to W. The soil is fertile, and the climate temperate and agreeable. A regular rainy season, like that of the tropics, lasts from March till October, swelling the rivers and flooding great districts of the plain, obliging the inhabitants to construct high causeways between the towns and villages. Earthquakes are frequent, but seldom severe. The country is rich in minerals, containing coal and petroleum, iron, and gold dust in some of the river sands. Tea, silk, sugar, tobacco, and ivory form leading articles of trade. The tea plant is indigenous here, and is largely cultivated under the auspices of the English "Assam Tea Company," more than 17,000 acres of tea plantations having been under cultivation within the last few years. Tigers, leopards, bears, deer, and other wild animals abound, and elephants are very numerous. The Assamese are akin to the Hindoo races. They are lithe and active, though generally slight in frame; they are almost beardless, and have unusually smooth skin. They live in huts of bamboo and mats, and lead rather indolent lives, carrying on few and unimportant industries. The most widespread religion is Brahminism, but there are also many Mohammedans. Assam was governed by a series of kings, concerning whose origin and reigns little is known, until the 17th century, when a formidable attempt was made by the Mogul emperors to attach it to their dominions. This was defeated; but from that time the country became the prey of revolutions, and gradually declined in power till 1770, when the British troops interfered in a revolution against the rajah, and occupied a portion of the territory. In 1826, in the war with Burmah, the British finally took possession of the country.

ASSASSINS (Arab. *Hashashin*, hashish smokers), a secret political society in Persia, Syria, and Arabia, in the middle ages, a branch of the Ismaëlians, so called from the imam Ismael ben Jafar. It took its origin in Persia about A. D. 840 from Abdallah, son of Maimun Kadah, a believer in the ancient Magian worship, who undertook by the preaching of his *dais* or missionaries to reëstablish the old religion, or at least to overthrow the power of the Abbasside caliphs. His followers were sometimes called Ibabié, "indifferents," and sometimes Ismaëlians, because they favored the pretensions of the descendants of Mohammed ben Ismael, of the house of Ali. One of his disciples, Ahmed, called Karmath, raised the standard of revolt, and for a whole century the East was involved in wars. Another partisan of the sect, the dai Abdallah, who styled himself a descendant of Mohammed ben Ismael, escaped from prison, where he had been confined by the caliph Motadhad, and succeeded in seating himself on the throne of Africa under the name of Obeidallah Mahdi, A. D. 909. This person was the founder of the dynasty of the Egyptian caliphs, who, tracing their descent to Ismael ben Jafar Sadik, and from him to Fatima, the prophet's daughter, are known by the name of Fatimites or eastern Ismaëlians. The secret policy of this sect was to overthrow the Abbasside caliphate. In the reign of Hakem-biamr-illah a lodge was instituted at Cairo called Dar el-Hikmet, house of wisdom. Access to this lodge, and the use of the books and mathematical instruments kept in it, as well as instruction by the professors, who were paid by the government, were free to all. In this lodge were taught nine secret doctrines deduced from those of Abdallah ben Maimun Kadah. In the first degree the mind of the novice was purposely perplexed, and a hidden meaning of the text of the Koran was suggested. After an oath of unconditional obedience the pupil was initiated into the second degree, which inculcated the recognition of divinely appointed imams, who were the source of all knowledge. The third degree taught their number, which could not exceed seven; these were Ali, Hassan, Hossein, Ali Seinolabidin, Mohammed el-Bakir, Jafar es-Sadik, and Ismael his son. The fourth grade taught that since the beginning of the world there have been seven divine lawgivers, or speaking apostles of God, each of whom had by command of heaven altered the doctrine of his predecessor. Each of these had seven coadjutors in succession, who, as they did not appear openly, were called mutes (*samit*). The first of the mutes was named Sus, and the seven speaking prophets were Adam, Noah, Abraham, Moses, Jesus, Mohammed, and Ismael ben Jafar. The fifth degree taught that each of the seven mute prophets had twelve apostles for the extension of the true faith, the number twelve being the most excellent after seven. After these five degrees the precepts of Islamism were examined, and it was shown that all positive religious legislation must be subordinate to the general and philosophical. The dogmas of Plato, Aristotle, and Pythagoras were adduced as proofs and laid down as axioms. In the seventh the student passed from philosophy to mysticism. In the eighth the pupil was perfectly enlightened as to the superfluity of all prophets and apostles, the non-existence of heaven and hell, the indifference of all actions, for which there is neither punishment nor reward either in this world or the next; and thus was he matured for the ninth and last degree, in which he became the blind instrument of his superior. This lodge was closed by the general of the caliph Amer Biakim-illah, but was soon reopened.—One of the initiated dais was Hassan ben Sabah, who became the founder of the eastern branch of Ismaëlians, the Assassins. Banished from Egypt, he went to Aleppo, Bagdad, and Persia, preaching his doctrine and making proselytes. Partly by stratagem and partly by force, he got possession of the almost impregnable castle of Alamut (eagle's nest) in the Persian province of Ghilan, strengthened it, and made it the seat of the central power of the Assassins. The basis of his political and religious system was: "Nothing is true, and everything is lawful." The knowledge of all the degrees was to be imparted only to a chosen few. The bulk of his followers were only initiated far enough to confuse their minds and leave them dependent upon their leaders, and the observance of all the precepts of Islamism was most strictly enjoined. At Alamut, and when their power was extended in other places also, the Assassins had splendid walled gardens with flower beds and fruit trees of every description, limpid streams, luxurious halls, and porcelain kiosks, adorned with Persian carpets and Grecian stuffs, drinking vessels of gold and silver and crystal, and charming maidens and handsome boys. A youth who was deemed worthy by his strength and resolution to be initiated, was invited to the table and conversation of the grand master; he was then intoxicated with hashish and carried into the garden, which on awakening he believed to be paradise. Sleeping again, he was carried back to the side of the master; and when the effect of the drug had passed away he believed that he had actually had a foretaste of the bliss of paradise, and henceforth blindly devoted himself to the will of his master, eagerly seeking an opportunity to sacrifice himself in order to attain eternal life. Later, when one of the grand masters allowed the enjoyment of every pleasure to all, the sect frequently intoxicated themselves with hashish, whence their name Hashashin, corrupted by the crusaders into Assassins, which, in view of their bloody deeds, came to signify men who practise secret murder in general. Jelal ed-Din Malek, sultan of the Seljuks, having sent an ambassador to the grand master to require his obedience and fealty, Hassan ben Sabah called into his presence

several of his followers. Beckoning to one of them, he said, "Kill thyself," and he instantly stabbed himself; to another, "Throw thyself from the rampart," and the next moment he lay a mutilated corpse in the moat. Then turning to the envoy, the grand master said, "Go tell thy lord, in this way I am obeyed by 70,000 faithful subjects." The grand master was called *seyed*, the lord, or more commonly *sheikh el-jebel*, chief of the mountain region (incorrectly translated old man of the mountain), because the order always maintained itself in castles among the mountains in Persia, Irak, and Syria. He never assumed the title of sultan or emir, and preached not in his own name, but in that of the invisible imam who was to appear at a future period. Immediately under the grand master were the *duah el-kibar*, grand recruiters or priors, his lieutenants in the three provinces to which his order extended. Under these were the *duah* or *dais*, the religious nuncios and political emissaries, the initiated masters. Then followed the *refiks*, fellows, who were advancing to the mastership through the several grades of initiation into the secret doctrine. Next came the *sedavi*, the guards of the order, the warriors, and devoted murderers; then the *sassik* (aspirants), the novices; and finally the profane or the people. Hassan laid down for his dais seven rules of conduct: 1. The *ashinai-risk* (knowledge of the calling) comprised the maxims for the judgment of character necessary in selecting subjects. 2. The *teenis* (gaining confidence) taught them to gain over candidates by flattering their inclinations and passions. 3. As soon as they were won, it was necessary to involve them by doubts and questions on the religious commands and absurdities of the Koran. 4. The *ahd*, or oath, bound the aspirant in the most solemn manner to inviolable silence and submission. 5. The candidates were taught how their doctrines agreed with those of the greatest men in church and state. 6. The *tessis* (confirmation) recapitulated all that preceded. 7. The *teevil* (allegorical instruction), in opposition to the *tensil* or literal sense of the divine word, was the principal essence of the secret doctrine, reserved only to a few of the initiated.—Hassan ben Sabah was speedily attacked by the sultan Malek, but he sustained himself, and even gained new strongholds. The practice of assassination by which he became the terror of eastern monarchs was first tried upon his early friend the grand vizier Nizam ul-Mulk. The death of the sultan, apparently by poison, soon followed, and then ensued a fearful series of murders and reprisals. Fakhr ul-Mulk Abul-Mosaffar, who had succeeded his father Nizam ul-Mulk as grand vizier, and another of the royal family, were assassinated. One of Sultan Sanjar's slaves, who had been won over to the Assassins, stuck a dagger into the ground near his master's head while the latter was asleep. Some days after the sultan received a letter from Alamut, saying, "Had we not been well disposed toward the sultan, we might have plunged the dagger into his heart instead of the ground." Peace was then concluded between the parties, and many privileges were granted to the Assassins. Hassan ben Sabah survived all his nearest relations and most faithful disciples. He slew two of his sons without any apparent cause. He died in 1124, at the age of 90 years, and was succeeded by his general and chief dai, Kia Busurg-Omid, in whose time hostilities were renewed by Sultan Sanjar, and great numbers of the Assassins were put to death. The vizier of Damascus gave them the castle at Banias, near the source of the Jordan, which became the centre of their power in Syria. In 1118 Abul-Wefa, the prior there, entered into a treaty with Baldwin II., king of Jerusalem, by which he bound himself to put the city of Damascus into his power in return for the city of Tyre; but the plot was discovered by the sultan, and the greater part of the Assassins and the crusaders were attacked and cut to pieces. At Cairo the Fatimite caliph Abu Ali Mansour fell by the dagger of an Assassin, and shortly after (1135) the Abbasside caliph was assassinated at Bagdad. The Assassins now spread all over the western part of Asia, from the confines of Khorasan to the mountains of Syria, from the Caspian to the southern shores of the Mediterranean. In 1171 the last of the Fatimite dynasty died, and the lodge at Cairo was overthrown. Saladin, who became sultan of Egypt, proved a formidable enemy to the Assassins. In the month of Ramazan, 1163, Hassan II., the fourth grand master, summoned the inhabitants of the province to Alamut, where he addressed the multitude, announced the day of resurrection or revelation of the imam, and commanded them to break the fast and give themselves up to all kinds of pleasure. A similar proclamation was made throughout the country, and was received by a majority of the people with joy. In 1175 the Assassins made two futile attempts on Saladin's life, and he in return ravaged their territory, and only desisted from completely annihilating their power on condition of his being in the future safe from their daggers. About 1191 Conrad, lord of Tyre and marquis of Montfort, a near relation of Leopold, duke of Austria, was murdered by two Assassins, said to have been hired for that purpose by Richard I. of England; and it seems that the imprisonment of the latter by Leopold was in reprisal for the death of his kinsman. Hassan III. prohibited everything that his grandfather and father had allowed, and again enforced the observance of the precepts of Islamism; and no assassinations were committed in his reign. By this prudent conduct he acquired the good will of the Moslem princes, and received from the caliph of Bagdad the title of sovereign prince, a favor never granted to any of his predecessors. Under his successor, Aladin Mohammed, the use of the dagger was resumed. About 1252 Hulaku, monarch of the

Mongols, captured Roknedin, the last of the grand masters, in his castle of Maimundis. Roknedin and his whole race were condemned to massacre; 12,000 captives were assembled and slaughtered at once; troops went through the provinces to execute the sentence, and many of the castles were demolished. In 1270 Sultan Bibars overthrew their authority in Syria. For about a century longer the Ismaëlians were numerous in Persia, but with diminished power. Assassins are said to remain still in some parts of the Lebanon and Persia, but only as a heretical sect of Islamism, and they seem to have lost all remembrance of their former power and murderous tactics. Some of their doctrines and practices are also traced in those of the Druses. The Persian Ismaëlians consider their grand master as an incarnation of the Deity. A few years since the fact of the existence of the order in India, widely diffused, was disclosed through a suit brought in the English courts for the possession of its records by a person claiming to be grand master.

ASSAULT, any wilful and unlawful attempt or offer, with force or violence, to do a corporal hurt to another. In New York it has been added to a definition of substantially the same import, that the assault may consist of any act tending to such corporal injury, accompanied with such circumstances as denote at the time an intention coupled with the present ability of using actual violence against the person. But this illustration is not quite correct, for to cover the cases of pointing firearms, though they are not loaded, at persons, the ability to do the injury need not be actual, but it is sufficient if it be only apparent. Nor need there be an actual intention to do the violent act; for if the assaulter causes it to be believed that he has such an intent, though he has not in fact, the assault may be committed. There must be some exhibition or threatening appearance of force, and this must ordinarily be of physical force. A threat alone is not an assault; yet such threat, spoken under circumstances which of themselves, so to speak, import restraint or force, may constitute the offence. One who, having an open knife in his hand, and being within striking distance of another, demanded with threatening words the surrender of a certain paper, was held guilty of an assault. Force may be exhibited by the raising of the hand or a weapon as if to strike, or to hurl something; or by the pointing of a gun or pistol within the range of the arm, as if to shoot with it, and even though it is not loaded, if it is reasonably supposed to be loaded by the person assaulted; or by wilfully riding a horse so near a foot passenger, or driving or attempting to drive a carriage against the carriage of another, or even by driving it toward the other, so as in any of these cases to excite reasonable fear of injury; or by pursuing another with a dangerous weapon, and coming so near him that he may reasonably apprehend danger. But an assault may be committed, even though the violent show of force is not actually within reaching distance, provided it be so near as to excite a fear of immediate harm in a person of fair firmness. Thus, where one was approaching another with clenched fist, as if to hit him, but was stopped by bystanders just before he got near enough to do so, he was held guilty of an assault. The force, and thus the assault, may exist to the eye of the law, even though it is not apparent on the face of the facts, and where from the submission or consent of the victim it seems that it could not have existed. This is illustrated by those cases in which schoolmasters or physicians have, by virtue of the authority or the trust reposed in them in these relations, induced young girls to submit to indecent maltreatment. In such cases the consent is regarded by the law as neither intelligent nor voluntary. Further, the force must be unlawful. Therefore it is not an assault when a father or a schoolmaster, for good reasons, chastises a child within proper limits. —Certain assaults are described as aggravated assaults. Such are assaults upon magistrates in courts of justice, or against other officers of the law. But it seems that to constitute such an offence, the person assaulted must be known to be such an official, or there must be grounds upon which it can fairly be presumed that he was known to be so.—Assault is a misdemeanor; that is to say, it is of an inferior degree of criminality, and is ordinarily punishable by fine or imprisonment, or by both.—Assault must be distinguished from battery. The words are commonly used together, for the reason that the two offences are usually committed together; but they are in fact distinct and separate. Battery is the actual infliction of the threatened violence. But the law will not permit even the threat of it, and therefore makes that a substantial offence, namely, an assault. (See BATTERY.)

ASSAYE, or **Assye,** a village of Hindostan, in the Nizam's dominions, 43 m. N. E. of Aurungabad, near which in September, 1803, the duke of Wellington (then Gen. Wellesley), with 2,000 British troops and 2,500 sepoys, defeated the much more numerous combined force of Scindia and the rajah of Nagpoor.

ASSAYING (old Fr. *asaier*, mod. Fr. *essayer*, to try), the chemical examination of an ore, a metal, or an alloy, to determine the proportions of its ingredients. The assay of a gold ore, to obtain the amount of gold present, consists of several operations. Fifty grammes of the ore are mixed with 80 grms. of oxide of lead, 20 of carbonate of soda, 4 of charcoal dust, and 12 of powdered glass. If the ore contains much silica, the glass may be left out; if much sulphur, 2 grms. of nails should be added. The mixture is placed in a Hessian sand crucible, covered by a layer of salt, and heated in a furnace for half an hour at a gentle heat, and then for half an hour at a white heat. When this crucible is taken out of the furnace and allowed

to cool and then broken open, a button or globule of lead will be found at the bottom, covered by a dark glassy slag and a layer of salt. This button contains the gold and most of the silver of the original 50 grms. of ore. The oxide of lead, the quartz, and carbonate of potash form a fusible glassy slag which absorbs earthy impurities. The oxide of lead and nitre unite to drive off the sulphur as sulphurous acid. The coal dust reduces a portion of oxide of lead to a fine spray of metallic lead, which in settling alloys the gold and silver, carrying them to the bottom of the crucible. The button usually contains, besides lead, gold, and silver, some copper, nickel, antimony, and sulphur, if these substances were present in the ore. The process of separating gold and silver from the other metals with which they are alloyed depends on the principle that they cannot be converted into oxides when heated in the air, while the other metals with which they are generally alloyed can be oxidized at a high temperature, especially when a large quantity of lead is present. The lead button is placed in an earthenware dish made of fire clay, called a scorifier (*scoria*, slag). A wind furnace containing a muffle is used for heating the assay in this and in the succeeding operation. The fuel generally employed is coke or anthracite; charcoal is sometimes used when the other cannot be obtained. The muffle is a flat-bottomed earthen vessel, 8 or 10 in. long, 3 or 4 in. wide, and 2½ or 3 in. high, its top arched over, one end open, the other closed; in fact it is half a cylinder open only at one end. In its roof and sides are little apertures through which the air drawn in at the open end can pass. It is set in the furnace, in the front of which is an opening corresponding to the open end of the muffle. Coals are heaped around and upon it to expose it to the full heat of the furnace. In the scorifier, when heated to a bright red heat, the so-called baser metals are oxidized and form a slag, leaving a small quantity of pure lead alloyed with silver and gold. This alloy while in the molten state is poured into a cooling mould, hammered to free it from slag, and is then ready for the next operation, which is called cupellation, and is performed in a little cup called a cupel. The cupels should be prepared of bone ashes well burnt, ground, and washed, and then shaped into cylindrical forms an inch or so high and 2 in. in diameter, their tops having a shallow depression to hold the metal. These cupels have the property of absorbing the oxides of metals and of holding those that will not oxidize; but as they cannot absorb a greater weight than their own of oxide of lead or litharge, not quite so much of this metal should be put into any one cupel as its own weight.—At the mints the assayer is mostly called upon to practise his art upon coin and bullion, alloys of copper, lead, gold, and silver, or containing two or more of these metals. In this case the previous operations of fusion in the crucible and slagging in the scorifier are omitted, and the assay begins at this point. The alloy to be assayed is carefully weighed in a delicate balance. It may be from 2 or 3 grammes, or even less, if already considerably alloyed. A proper quantity of lead, known to contain no silver, is put with it, and the two are placed by means of small tongs in the cupel, which with the muffle has been brought to a full red heat in the furnace. It is convenient to carry on several of these operations at once, and therefore a number of the cupels are usually introduced together on the floor of the muffle. The metals when placed in the hot cupel immediately melt and form a bright globule, which spins around and keeps in continual motion. The air drawing in through the muffle oxidizes its surface, and fumes of the oxide of lead are carried off by the draft. At the same time a floating scum of the oxide is constantly flowing down the sides of the globule and sinking into the cupel, while freshly formed oxide replaces it. Any copper that is present is oxidized with the lead and absorbed into the cupel. Thus the operation goes on till it terminates by all the lead being oxidized, which is indicated by a sudden brightening up and subsequent darkening of the little globule, and the cessation of the appearance of the fumes and scum of oxide. This little globule, which is pure silver, pure gold, or an alloy of the two metals, shows by its weight the quantity that was in the sample. Care should be taken to avoid too intense heat, as this may volatilize a portion of the silver; and the globule should not be cooled suddenly, as the pure metal absorbs oxygen when melted, and gives it out in cooling. If the change is sudden, some silver is apt to be ejected with the gas. By a little experience and care this operation is made so perfect that no sensible difference should be detected in the weight of two buttons obtained from two assays of equal weights, when tested by a balance that turns with $\frac{1}{20}$ of a milligramme. The quantity of lead that should be added is a matter that can only be determined by experience. Too little lead for the oxidation of impurities prevents the formation of a clean button of silver, free of oxide, and too much lead is apt to carry down with it into the cupel a small quantity of silver. This operation is often performed with the blowpipe, and small cupels adapted to its uses. The weight of the little button is ascertained by the size of the round hole, of a graduated series of such holes in a brass plate, which it fits, the weight of a button of silver or one of gold for each hole having been previously ascertained. In skilful hands this is conducted very expeditiously, and with considerable accuracy. It is especially adapted to the testing of argentiferous lead ores, to determine approximately their percentage in silver. The lead also may be quantitatively determined by the reducing process with the blowpipe, that must precede the cupelling. If the button

when taken from the cupel proves to be pure silver, it shows at once the value of the sample of ore or bullion; but if it contains gold, as in the gold assay, the amount of gold must be found out and subtracted from the weight of the button, and the amount of each metal will then be known. To this end the alloy of these metals is separated by the process called parting, or quartation, as it is usually conducted upon an alloy made to contain at least three parts of silver to one of gold. If the silver is in larger proportion, the gold cornet will crumble; but when of small amount compared with the gold, it is shielded by the gold from the action of the dilute nitric acid which is used to dissolve out the silver. To insure a perfect union of the gold and silver added to it, it is well to melt them with lead, and then separate the lead by cupelling. More heat may be safely applied than when silver is cupelled without gold, as the alloy of these cannot waste by volatilization. The button is hammered out, heated red-hot, and annealed, and then rolled into a thin plate, which is coiled up of the size of a quill, and called a cornet. This is put into a parting glass, and two or three times its weight of pure nitric acid is poured upon it. Some heat is applied, when red fumes of hyponitric acid are given off, and in a short time the silver is dissolved, and the gold is left, still retaining the form of the coil, but forming a brittle, spongy, brown mass. The solution of silver is poured off, and a strong acid is added to the gold, and heated to dissolve out the last traces of silver. This is poured off, and the gold is washed with hot distilled water. It is carefully taken out, put in a crucible, and heated, when it shrinks together and regains its metallic lustre and the fine color of gold, with its softness and flexibility. Being now weighed, the process is finished by the calculation of the quantity lost. The silver is recovered by precipitating it from the solution by the introduction of bright sheets of copper, for which metal the acid has a greater affinity than for the silver. It is ascertained that in this process the silver is never entirely taken up by the nitric acid, and that some gold is dissolved by the strong acid, as is found by preserving for years the same acid to extract the last traces of silver. The inside of the bottle containing it becomes at last coated with fine gold. This has been noticed in the British mint, and full 30 grains of gold have been collected from bottles thus used. Very small errors are thus involved in estimating the quantities of silver and gold by this process.—Assayers and metallurgists at the present time prefer what is termed the wet method, performed by the aid of acids and solutions, and called wet in contradistinction to the dry or furnace assay, for the determination of the amount of iron, zinc, copper, and antimony in the ores of these metals. The estimation of the amount of iron in an ore is performed by the aid of a solution of permanganate of potassium. When a solution of this salt, which is of a beautiful violet color, is added to a solution of protoxide of iron, the protoxide is immediately converted into the peroxide, and the solution loses its color. If, however, the permanganate of potassium is added with constant stirring until all the protoxide is converted into peroxide, and one drop too much added, that one drop will color the whole iron solution very distinctly. It is found that the same amount of iron always requires the same amount of permanganate of potassium to give the first color. The permanganate of potassium is termed a standard solution. If then 0·2 grm. of iron is dissolved in acid (muriatic), and the standard solution added from a measuring tube, we can determine the amount of solution needed for 0·2 grm. iron; and when an ore is dissolved, and changed to protoxide by dissolving zinc in it, and the standard solution added, we obtain the amount of the solution needed for the amount of iron in the ore. And the problem is solved by this proportion: as first amount of standard is to second amount of standard, so is 0·2 grm. of iron to the amount of iron in the ore. The dry method of assaying iron ores is still used to assist the masters of iron furnaces in planning the proportions of ingredients to be used in the blast furnace for the production of iron. It is based upon the same principles as the reducing them in the blast furnace. The oxygen with which the metal is combined must be taken up by presenting to it some substance for which it has stronger attractions than for iron, and the earthy impurities must have such substances added to them that the product of their union will be a glassy fluid, through which the globules of metallic iron can easily sink and collect together in a button. Charcoal is the substance for deoxidizing the ore in the blast furnace and in the crucible. The matters for aiding the fusion, called the flux, vary according to the earthy ingredients of the ore. The desired glassy fluid is a silicate of lime and alumina, and it may be of magnesia. If the ores already contain much silica, carbonate of lime, with the addition of some alumina or common clay, constitutes the proper flux. Ores deficient in silica require an addition of it. Some ores contain such a mixture of proper fluxing ingredients, that they melt easily without any addition of these matters. In the crucible, a little borax increases very much the fusibility of the mixture. The ore and fluxes should be thoroughly ground and mixed together, and placed in a brasqued crucible, that is, one carefully filled and rammed with fine charcoal, moistened with water to a paste, and out of the top of which a cavity is excavated for holding the assay sample. The crucible is to be placed in a wind furnace, and gradually heated for half an hour, when the whole force of the blast is to be applied for half an hour longer. A button of cast iron will be found in the bottom of the crucible when it has cooled.—The wet as-

say of copper is performed by dissolving a weighed amount of ore in nitric acid, and removing sulphur if present by an addition of chlorate of potassium. Muriatic acid is added, and the nitric acid removed by evaporation. The residue is dissolved in water and muriatic acid and filtered; the copper is precipitated from this solution by pure zinc or iron, and the resulting copper sponge is washed by decanting the liquid and replacing it by distilled water, and then quickly dried and weighed as metallic copper; from this weight the value of the ore is easily calculated. The dry assay of copper is still in use in Cornwall, at Swansea, and at some other places. It is, as conducted by metallurgists, often an empirical process, the fluxes being added with very vague ideas as to their true effect. The ores are properly classified into those which contain no sulphur, arsenic, or any foreign metals but iron; those which contain sulphur, iron, arsenic, antimony, &c. Ores of the first class, containing over 3 per cent. of copper, are reduced in a crucible by the addition of three parts of black flux. Poorer ores may be assayed in the wet way. The second class are sulphates or sulphurets. The former are easily decomposed by heat in a platinum crucible, when they may be treated as substances of the first class. The sulphurets, under which general head are included most of the workable ores of commerce, are treated in a great variety of ways. The first operation, after reducing them to fine powder, is to roast or calcine them, to expel the sulphur. This process requires care and experience, and is most thoroughly effected, according to Mitchell, by adding one tenth of their weight of carbonate of ammonia to the roasting mass in the crucible, constantly stirring it in as the calcining goes on. Sulphate of copper is produced by the roasting; and on addition of carbonate of ammonia, by double decomposition, sulphate of ammonia forms, which being volatile can be expelled by heat. The ore is then thoroughly mixed in a mortar with 25 per cent. of its original weight of lime, and 10 to 20 per cent. of fine charcoal, and 1½ time its weight of dry carbonate of soda. The whole is to be placed in the same crucible in which the roasting was done, and covered with its weight of glass of borax. It is then subjected to a moderate heat for a quarter of an hour, and to a bright red heat as much longer. On cooling, and breaking the crucible, the button of copper will be found in the bottom. It is well to make two parallel assays of these ores, that one may confirm or disprove the other.—The varieties of lead ores which are most commonly subjected to assay are the sulphurets (galena) and the carbonates. The former is treated by taking 400 or 500 grains, coarsely powdered, and mixing with it one fourth its weight of black flux, one fourth of iron nails, and one eighth of cream of tartar. The crucible should be large enough to contain double the quantity, and the charge should be covered with common salt half an inch deep. After being exposed to a high heat for ten minutes, the lead may be poured out, or suffered to cool in the crucible. If the ore contain much earthy or pyritous matter, a less proportion of iron filings should be used, and a little fluor spar and borax be added. Galena is conveniently assayed in an iron crucible, the crucible itself furnishing the material for desulphurizing the ore. The usual quantity, say 400 or 500 grains, is mixed with 2½ times its weight of carbonate of soda, and put in an iron crucible, which is covered. The galena is decomposed, and sulphuret of iron formed. The lead is poured out into an ingot mould, and the crucible well tapped to obtain all the lead. Another sample is immediately put in while the crucible is hot, and the operation repeated as long as the crucible lasts. The carbonates are assayed with half their weight of black flux, and a little cream of tartar, with a superficial covering of salt.

ASSELYN, Jan, a landscape painter, born in 1610, died in Amsterdam in 1660. He studied under Jan Miel and Isaiah Vandervelde at Antwerp, and under Peter van Laer (Bamboccio) at Rome. In his landscapes taken from the vicinity of Rome, which are enriched with ruins of edifices, and decorated with figures and cattle in the style of Berghem, he imitates the manner of Claude Lorraine. He also painted battle pieces of considerable merit. He was surnamed *Krabbetjie* (little crab, crab-like) by the Dutch artists at Rome, on account of a contraction in his fingers.

ASSEMANI. I. Joseph Simon, a Syrian orientalist, born at Tripoli (Tarablus) in 1687, died in Rome, Jan. 14, 1768. After spending many years in the study of eastern languages, he was employed to collect oriental manuscripts for the library of the Vatican, and finally appointed custodian of the collection, which he largely increased. His principal works are: *Bibliotheca Orientalis Clementino-Vaticana* (Rome, 1719–'28); *Kalendaria Ecclesiæ Universæ* (1755–'7); *Bibliotheca Juris Orientalis Canonici et Civilis* (1762–'4). He edited also an edition of the *Opera Ephraemi Syri* (1732–'46). **II. Stephan Evodius,** nephew of the preceding, born at Tripoli in 1707, died Nov. 24, 1782. Like his uncle he devoted himself to the study of oriental languages, and like him was made custodian of that department of the library of the Vatican, from which post he was appointed archbishop of Apamea. His investigations among oriental manuscripts were embodied in his two works, *Bibliothecæ Mediceo-Laurentinæ et Palatinæ Codices Manuscripti Orientales* (Florence, 1742), and *Acta Sanctorum Martyrum Orientalium et Occidentalium* (Rome, 1748). **III. Joseph Aloysius,** brother of the preceding, born at Tripoli about 1710, died in Rome, Feb. 9, 1782. Pursuing the same studies as his uncle and brother, he was appointed professor in the Sapienza at Rome. His works are: *Codex Liturgicus Ecclesiæ*

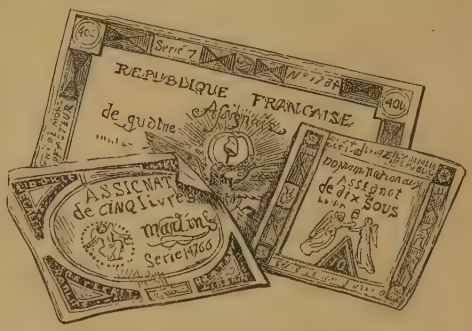
Universalis (Rome, 1749), and *De Catholicis seu Patriarchis Chaldæorum Nestorianorum* (Rome, 1775). **IV. Simon,** a distant relative of the preceding, born at Tripoli, Feb. 20, 1752, died in Padua, April 8, 1821. In 1785 he was appointed professor of oriental languages at Padua, and acquired fame as a student of oriental numismatics, on which subject he published his *Museo cufico Naniano illustrato* (Padua, 1787–'8), and other works.

ASSEN, a town of the Netherlands, capital of the province of Drenthe, 14 m. S. of Groningen, on the Horn-Diep, which is connected by means of a canal with the Zuyder-Zee; pop. in 1867, 6,443. Near the town are celebrated giants' graves.

ASSER, or **Asserius Menevensis,** a monk of St. David's or Menevia, in Wales, died about 910. At the request of Alfred the Great he left his monastery for a part of each year to visit the court, where he read Latin with the king and corrected his translations. Alfred gave him many ecclesiastical preferments. Some authorities say he became bishop of Sherborne. Asser's great work is his "Life of Alfred," in Latin. The earliest edition is that of Archbishop Parker, at the end of Walsingham's "History" (1574). The best edition is that of Wise (Oxford, 1722), entitled *Annales Rerum Gestarum Ælfredi Magni.* This is our chief authority for the events of Alfred's public and private life from his birth to 889, and conveys much incidental intelligence about the laws, manners, and general civilization of Wessex. Thomas Wright, in the *Biographia Britannica Literaria,* maintains that this life was written at a later date, and Asser's name affixed to it.

ASSIENTO (Sp. *asiento*, treaty), a term used to designate the treaties made by Spain with foreign countries for the supply of negro slaves to her South American provinces. The Spanish government, having no settlements on the African coast, encouraged adventurers to supply slaves by securing to them a monopoly of the trade, with other commercial privileges. The Flemish merchants received the contract from Charles V.; Philip II. gave it to the Genoese, under whose title the traffic was chiefly carried on by British traders; and Philip V. to a French company. The terms of this last assiento were the privilege of sending a ship of 500 tons with merchandise free of duty to Spanish America, and the payment of a sum on each imported negro, the minimum number of slaves being fixed at 4,800 annually. This contract was transferred by the same king to the South sea company, but abrogated shortly after at the peace of Aix-la-Chapelle. It never gave satisfaction to Spain; and the contractors always lost money, their local factors and agents reaping the profits.

ASSIGNATS, the paper currency of the French revolution, first issued in the spring of 1790, to be redeemed by the sale of the confiscated property of the clergy and the emigrants. The assignats kept their value above 90 per cent. till 1792, but from that time they began to droop. The original issue of 1,200,000,000 francs was increased to 45,578,000,000, besides which there were in circulation a great number of counterfeit notes manufactured abroad. Great efforts were made to prop the market, and stringent laws were enacted to fix prices and force the people to accept the notes at their nominal value; but they soon fell to 60 per



cent., and in 1795 were worth only 18 per cent. In 1796 they were redeemed at $\frac{1}{30}$ of their face in *mandats*, entitling the holder to enter at once upon possession of the public lands at an estimated price. The mandats soon fell to $\frac{1}{70}$ of their nominal value, and in July, 1796, a law was passed authorizing the circulation of mandats at their current value, which resulted in the speedy disappearance of the notes.

ASSIGNATIONS, Russian paper money, introduced early in the reign of Catharine II., about the year 1770, principally to carry on the wars against the Turks. The standard currency was then as now the silver ruble, and the paper assignations on the banks—likewise founded by Catharine—were to represent in full the standard silver coin. But they soon fell until the assignation ruble was worth only one half, one third, and finally one fourth of the original value; and thus it became necessary to specify the nature of the ruble in all transactions. From 1787 the use of assignations as currency was general. In the reign of Paul I. the merchants of St. Petersburg, foreign and domestic, refused to receive assignations at the government standard in payment. Stringent ukases for facilitating the circulation of assignations all over the empire proved unsuccessful, and at the death of Paul (1801), and during the greater part of the reign of Alexander I., the assignation ruble was generally worth one fourth of the silver. During the wars against Napoleon the issue of assignations increased excessively, but no considerable additional depreciation took place. With peace the assignations rose, and finally the government fixed the standard at 3 rubles 60 copecks, either of copper or assignations, for a silver ruble, one assignation ruble equalling 100 copecks copper, and four copecks copper making one of silver. On account of the facility of carrying large

amounts in paper, the assignations soon came into such demand as to be worth a premium. This premium naturally increased with the distance inland, and the fluctuations were so irregular that in 1839 a ukase regulated the value of the assignations at 3½ to 1 silver, and ordered that henceforth the silver ruble should be the legal unit in all negotiations and legal documents; that a new paper money, called "bills of credit," should be issued, and the old assignations gradually withdrawn from circulation and destroyed. This was accomplished.

ASSIGNMENT, in law, the making over or transferring of any species of property. It also signifies the deed or instrument by which the transfer is operated. The assignment of a lease is the transfer of the assignor's whole estate in the term created by the original lease. The difference between an assignment and an underlease is that the underlease retains the reversion, whereas the assignment parts with it. Assignment in commercial law was formerly much restricted. Bills of lading and bills of exchange were not assignable. All interests in personal property, of which a man has not the actual possession, but merely the right to recover, are choses in action. Thus a debt, whether specialty or simple contract, is a chose in action, a something to be recovered. These were not assignable. These restraints were, however, evaded by a license to use the name of the legal creditor. Even under a bill of sale of goods, the property in them does not pass unless by actual delivery and possession as against *bona fide* creditors. Both by the English and French law, property in the power and disposition of a debtor may by process of law be transferred to his creditor.

ASSING. I. Rosa Maria, a German poetess, sister of Varnhagen von Ense, born in Düsseldorf, May 28, 1783, died Jan. 22, 1840. The outbreak of the French revolution obliged her family to take up their residence in Strasburg, and in 1796 they removed to Hamburg. After the death of her father in 1799 she became a teacher. In 1816 she married Dr. Assing, a physician of Königsberg, who on her account removed to Hamburg, where his house became a favorite place of literary reunion. The poet Chamisso was a frequent visitor. Rosa's poems have been published, with a memoir of her life, under the title of *Rosa Maria's poetischer Nachlass* (Altona, 1841). **II. Ludmilla,** daughter of the preceding, born at Hamburg, Feb. 22, 1827. After the death of her parents she resided in Berlin with her uncle, the celebrated Varnhagen von Ense, occupying a daughter's place in his house, and receiving an unusually complete education. She first published essays in newspapers and reviews, and in 1857 produced a biography of the countess Elisa von Ahlefeldt. Several other biographies followed from her pen. On the death of her uncle she edited the unpublished portion of his *Denkwürdigkeiten*, issuing the 8th and 9th volumes in 1859. In 1860 she also published Alexander von Humboldt's letters to her uncle, and in 1861–'2 the diaries of Varnhagen von Ense himself. The manner in which political events are treated in this collection brought her into disfavor with the court, and in May, 1862, an action was begun against her in Berlin—she having in the autumn of 1861 taken up her residence in Florence—which resulted in her conviction as a traducer of the king, queen, and various personages, and in her sentence to eight months' imprisonment. A similar trial, and sentence to two years' imprisonment, followed the publication of the remaining volumes of the collection in 1864; but she never actually underwent these punishments. She has since translated much from the Italian.

ASSINIBOIN, a river of British North America, rising in lat. 51° 40′ N. and about lon. 105° E., and joining the Red river of the North at Fort Garry, Manitoba, in lat. 49° 54′ N. Its course is a distance of over 400 m. At a point 22 m. above Fort Garry it is 120 ft. wide, and has here in summer a mean depth of about 6 ft.; 140 m. from its mouth its breadth becomes 230 ft. and its mean depth over 8 ft.; at 280 m. its depth increases to over 11 ft. with a width of 135 ft. It receives in its course the waters of the Little Souris, Qu'appelle or Calling river, the Rapid river or the Little Saskatchewan, White Sand river, and Beaver creek. At its junction with the Little Souris, 140 m. from Fort Garry, the volume of water is 12,899,040 gallons an hour; while at Lane's Post, 118 m. lower down, this volume is diminished, Mr. Hind asserts, more than one half; a result which he attributes to evaporation. At Fort Ellice the secondary banks are 240 ft. high, forming an eroded valley nearly a mile and a half wide. Parts of its course are bordered by inconsiderable forests of oak, ash, elm, maple, birch, poplar, and aspen.

ASSINIBOINS, a tribe of Indians of the Dakota family, in Montana territory, United States, and in Manitoba and the region round about in British America. They were a part of the Yankton Sioux, but after a bitter quarrel about women separated from the mass of the nation about the beginning of the 17th century, and the two parties have since been hostile. Their own distinctive name is never used: the neighboring Algonquin tribes called them Assinipwalak, Stone Sioux, or Stone Warriors, as some infer from the nature of their country near the Lake of the Woods. The adventurous French missionaries reported them as a nation as early as 1640, and at a very early period they traded furs on Hudson bay. In the British provinces they are divided into Assiniboins of the prairies, who are tall, vigorous, and thievish, and Assiniboins of the woods, who are wretchedly poor. They extend from Souris or Mouse river to the Athabasca, and number some 5,000. There are Roman Catholic and Methodist missions among them at Lake Ste. Anne and Pigeon lake. They are friends and allies of the Crees,

and live intermixed with them. In the United States the Red Stone Assiniboins and Upper Assiniboins were estimated in 1871 at 4,850 souls.

ASSISI (anc. *Asisium*), a town of Italy, in the province and 13 m. E. S. E. of Perugia, picturesquely situated on the declivity of a steep hill; pop. about 6,200. It is especially noted as the birthplace of St. Francis, the founder of the order of Franciscans, and contains 12 monasteries of that order. Here are the church and monastery in which St. Francis is buried, and about 2 m. from the town is the celebrated Portiuncula or church where Francis began the preaching of his ascetic life. Assisi was once a Roman municipium of some importance, having a temple of Minerva, of which several Corinthian columns still stand. The region around abounds in mineral waters.

ASSIZE, a term of the common law, having reference to several distinct subjects. Its most general uses are to designate an ordinance for regulating the sale of provisions, and the periodical sittings held by the judges of England and law officers in the various circuits of England and Wales, for the trial of lawsuits as well civil as criminal. The term is of uncertain derivation. It may be either from Lat. *assido*, to assess, or *assideo*, to sit near or together, both of which are incident to the functions discharged at assizes. Suits for the recovery of land were anciently tried by writ of right, or of assize. On these occasions the sheriff impanelled four knights and twelve assistants to try the matters in dispute. This assize could only be held before a judge of the principal courts at Westminster, whereby enormous expense was entailed on the jurors, the parties, and the witnesses. To remedy this grave inconvenience, provision was made by Magna Charta that an assize should be held annually by a judge in each county. This declaration was enlarged by the statute of Westminster (13 Edward I., c. 3), which gave jurisdiction to the judges to sit in the grand assize, not only for the purpose of settling disputes as to land, but also for the adjudication of all civil actions. The sittings thus held are familiarly known as sittings at *nisi prius*. This term originated from the form of the process for summoning and impanelling the jury, which, following the words of the statute of Westminster, directs the sheriff to summon a jury to be at Westminster on the first day of term, unless before (*nisi prius*) a judge shall come to try issues in the county.—The criminal jurisdiction of the court at the assizes is derived from a commission of oyer and terminer and general jail delivery. Courts for these purposes are held at each assize. Two assizes a year are held throughout England and Wales, and in the metropolitan and some other counties which comprise populous districts. Three assizes are held under modern statutes. Courts of quarter sessions are also held in the several counties, cities, and boroughs. The sessions despatch business of a quasi-judicial character, as ale-house licenses, poor-law questions, or appeals under certain statutes; and of late years, with a view of relieving the pressure of assize business, jurisdiction has been given to county magistrates sitting in sessions to decide certain criminal causes of minor importance. Under the statute, the assizes are held by two judges of the superior courts of Westminster, one of whom usually presides in the criminal, the other in the civil court. All reserved points of law, exceptions, and other purely legal questions arising out of the proceedings at the trial, are argued subsequently at Westminster before the full court. Final judgment cannot be entered up until after the first four days of the term next after the assizes, which gives opportunity to move the court above for new trials, to set aside verdicts, or to stay judgment for any cause assigned. To obviate the evils of the delay thus afforded by common law, a recent statute gives discretion to the judge at *nisi prius* to certify for immediate execution, in all cases of simple contract debts. The bar at the assizes, or "upon circuit," as the more correct phrase is, is composed of the same barristers who argue at Westminster, each in his particular circuit, selected at the beginning of his career, and from which by etiquette he cannot deviate except in extraordinary cases.—**Assize of Bread,** or provisions (*assisæ venalium*), in England, was the ordinance of a royal officer, or of the municipality, fixing the price and quality of bread, beer, meat, fish, coals, and other necessaries. This was anciently fixed by the clerk of the market of the king's household. By some municipal charters this power was delegated to the corporation. The earliest distinct notice of such an assize bears date 1203. All regulations of the kind were abolished for London and its vicinity in 1815, and they have everywhere fallen into disuse.—**Assizes of Jerusalem** were the laws made in 1099 by Godfrey of Bouillon, and his princes and clergy, for the regulation of the kingdom of Jerusalem, formed in the first crusade.

ASSUAY. See ASUAY.

ASSUMPSIT (Lat., he undertook), in law, the compendious title under which an extensive class of actions are included. After stating the cause of action, the pleadings state that thereupon "the defendant promised to pay." Assumpsit may be either special or common, also called *indebitatus assumpsit*. Under the former are included actions upon written contracts or agreements of all kinds; actions for derelictions of duty by professional men, carriers, or warehousemen; in short, under every circumstance where a contract is in actual existence or can be predicated from the relations of the parties. Common assumpsit is an action brought for goods sold and delivered, money lent, &c. Theoretically all actions of assumpsit are brought to recover compensation in the nature of damages; but, where those damages can be immediately ascertained by the acts of the parties, as for goods sold and

delivered, where a price has been agreed upon, then it is common assumpsit.

ASSUMPTION, a festival of the Roman Catholic church, instituted to commemorate the ascent of the Virgin Mary into heaven. From a very early period it has been a belief in the western and oriental churches that after her death the Virgin was taken up, body and soul, into heaven. This event is called in the ancient ecclesiastical writings the "assumption," "passage," or "repose," and is mentioned by various early authors, among whom are St. Gregory of Tours in the 6th century, and Andrew of Crete at the beginning of the 8th. The date of the institution of the festival is unknown, but it is mentioned as having been celebrated with great solemnity before the 6th century, in both Greek and Latin churches. It falls on Aug. 15.

ASSUMPTION, a S. E. parish of Louisiana, W. of the Mississippi river, having within its limits Lake Verret and a part of Bayou La Fourche; area, 320 sq. m.; pop. in 1870, 13,234, of whom 6,984 were colored. The soil is very fertile, and the parish is one of the most productive sugar districts in the United States. In 1870 it produced 246,929 bushels of Indian corn, 17,229 lbs. of rice, 9,558 hhds. of sugar, and 499,135 gallons of molasses. Capital, Assumption.

ASSUMPTION, a city of South America. See Asuncion.

ASSUMPTION, one of the Ladrone group of islands in the Pacific ocean, lat. 19° 41′ N., lon. 145° 27′ E. It is of volcanic origin, rises to the height of about 2,000 feet, and is nearly 10 miles in circumference. It produces cocoanuts, rice, oranges, and breadfruit.

ASSURANCE. See Insurance.

ASSWAN, or **Assuan** (anc. *Syene;* in the Hebrew Scriptures, *Seveneh*), a town on the southern border of Egypt, on the right bank of the Nile, opposite the island of Elephantiné, in lat. 24° 5′ N., a little below the 10th cataract, where the river is first navigable; pop. about 4,000. The tropic of Cancer was anciently but erroneously drawn here. The surrounding country is sandy and desolate, and, with the exception of a few palm groves, is almost destitute of vegetation. The inhabitants are Egyptians, Nubians, and the descendants of Bosnian troops garrisoned there by Sultan Selim I., the conqueror of Egypt, in 1517. Asswan has considerable commerce in dates, senna, wicker baskets, ivory, ostrich feathers, tamarinds, coffee, and slaves. On the S. side are the ruins of an ancient Saracen town, where during the middle ages 20,000 persons died by one visitation of the plague.

ASSYRIA (Gr. *Ἀσσυρία*; Heb. *Ashshur*), an ancient country in Asia, lying upon both banks of the Tigris, the seat of one of the great monarchies of antiquity, and now comprised within the easternmost dominions of the Turkish empire. The name comes from Asshur, a son of Shem and grandson of Noah, probably a leader in one of the great early migrations, who was deified and recognized as the tutelary divinity of the country occupied by the descendants of the clan of which he was the chief. In its earlier and most limited sense, Assyria was a narrow territory, mainly on the E. bank of the Tigris, including the triangle formed by that river and the Greater Zab (the Zabatus or Lycus of the classical writers), a district especially known as Aturia; the district of Adiabene, between the Greater Zab and the Lesser (the Caprus of the Greeks and Romans); and some regions to the southeast of the latter. Assyria was thus bounded N. by the snowy Niphates range, which separated it from Armenia, and E. by the Zagros mountains of Kurdistan, which separated it from Media, and on the S. and W. it bordered on Susiana, Babylonia, and western Mesopotamia. It was mountainous in the north and east, a rolling plain in most other parts, and east of the Tigris well watered. Later, when Assyria became the predominant power in the region, the name came to embrace also all northern Mesopotamia. Still later, and in the widest sense, Assyria denoted the entire plain watered by the Euphrates and the Tigris, together with the countries to the west, north, and east, which became subjects of or tributary to the great Assyrian empire.—There is no record of the time when the country was first peopled. Berosus, whose chronology from the commencement of the historic period is confirmed from various sources, makes a period of 36,000 years before the capture of Babylon by Cyrus (538 B. C.); but of this, 34,080 years belong to a mythical dynasty of 86 kings. This number is merely assumed to make up the grand Chaldean cycle of 36,000 years. His historic chronology begins at 2458 B. C., a short period before the time when, according to the Scriptural narrative, Nimrod established his reign in "Babel, and Erech, and Accad, and Calneh, in the land of Shinar," out of which land "went forth Asshur, and builded Nineveh, and the city Rehoboth, and Calah, and Resen between Nineveh and Calah," all cities on or near the upper Tigris. From this time for fully 1,000 years there is no record of Assyria in the Hebrew writers; and down to about 1850, when the inscriptions of Nineveh and Calah had been unearthed and deciphered by Botta, Layard, and others, there was absolutely nothing known of the true history of this great empire, which lasted more than 1,000 years, except as it was for a brief space connected with that of the kingdoms of Israel and Judah. The legends of Ninus, Semiramis, Ninyas, and Sardanapalus have no other foundation than that among the Assyrian kings was one named Asshur-idanni-pal, or similarly, and a queen Sammuramit; that Nineveh was taken by a revolt in which the Medes took part; and that the final destruction of the great palace was by fire.—The earliest known native document of Assyrian

history is impressed upon three clay cylinders found by Layard at Kileh-sherghat, the earlier Asshur, one of the capitals, the only one situated on the right bank of the Tigris. It forms the records of King Tiglath-pileser I., whose date is by other records fixed at about 1130 B. C. From this and other monuments it appears that for many centuries there were in the lands on the Tigris and Euphrates two rival kingdoms, Babylonia and Assyria, each in turn superior to the other; and that about 1250 Assyria had come to be a powerful and compact kingdom, under a single monarch, surrounded on the north and east by scattered tribes, who sometimes coalesced into temporary alliances, but were one by one beaten down and rendered tributary. The Assyrian capital was at Kileh-sherghat, the old Asshur, some 60 m. below Nineveh, and on the opposite bank of the Tigris. On the west it reached the Euphrates; on the south was the rival kingdom of Babylonia. For the next two centuries the history of Assyria is almost a blank. During this period a compact kingdom of Israel was founded by David. The dominion of David and Solomon stretched beyond the range of Lebanon, nominally reaching quite across the desert to the banks of the Euphrates; but it is clear that neither David nor Solomon ever came into contact with the Assyrian power. This power seems indeed to have then become enfeebled; and when, after the separation into Israel and Judah, the Hebrews were pressed back within their old limits, the new kingdom of Damascus had arisen. When our record is resumed, the residence of the Assyrian kings had been removed 40 m. up the Tigris to Calah (now Nimrud), on the E. bank of the river. At the angle formed by the junction of the Upper or Greater Zab, Calah was only 20 m. below the site now recognized as that of Nineveh, and possibly was considered a part of that great city. The monarch whose reign was from 886 to 858 appears on the inscriptions as Asshur-nasir-pal (or, according to other readings, Asshur-izir-pal or Asshur-idanni-pal), "the great king, the powerful king, king of hosts, king of Assyria." He overran the mountain region of Armenia and Kurdistan, and his furthest expedition was through Lebanon and the valley of the Orontes to the Mediterranean shore, where he received the submission of the chief cities of Phœnicia. From Lebanon he brought back the cedar which was used to ornament his palace at Calah or Nimrud. The sculptures from this palace are among the most striking of all the Assyrian remains. He was succeeded by his son Shalmaneser II., whose reign lasted from 858 to 823. He is known as the "black obelisk king," from an obelisk 7 feet high and 22 inches wide, now in the British museum, upon the four sides of which is portrayed, pictorially and literally, the history of his 27 campaigns. These were carried on upon the middle Euphrates, in Babylonia, in the mountains of Kurdistan and Armenia, upon both slopes of Lebanon, down the valley of the Orontes, and in the kingdom of Israel. Among the prostrate figures is one described as Jehu the son of Omri, the king of Israel. The Assyrian king moved down the Mediterranean coast, leaving Judah on his left untouched, but receiving tribute from the Phœnician cities of Tyre, Sidon, and Byblus. Five years before his death Shalmaneser was dethroned by a revolt headed by his eldest son. This revolt was put down by a younger son, Shamas-iva, who reigned 13 years (823–810), carried his arms into Media and Babylonia, and was succeeded by his son Iva-lush, who married Sammuramit, a Babylonian princess who, as the only female ruler recorded in Assyrian history, furnished the Greek fabulists with the name of Semiramis. Babylonia and Assyria seem now to have been formally united; the government of the former being specially put into the hands of a member of the royal Assyrian family, who acted as viceroy. Nineveh, the main ruins of which are now visible at Koyunjik and Nebbi-Yunus, opposite Mosul, had now become the Assyrian capital. The book of Jonah, who is believed to have lived during this period, is of historical value from the glimpse which it affords of the extent of that great city in its palmiest days. If we assume that the 120,000 persons who "knew not their right hand from their left," that is, children, is an approximation to the census, the population of the city would be about 600,000. It is mentioned as a city of three days' journey, containing also "much cattle"; other authorities say it was 17 m. long and 10 broad. The probability is that Nineveh, like Babylon, was a district, about as large as our District of Columbia, enclosed with high walls, containing pastures, fields, and gardens, besides several strongly fortified points. Three other reigns fill up the interval from 781 to 745. With the last of these the reigning dynasty seems to have come to a close; for in 745 we find Tiglath-pileser II., apparently a usurper, on the throne, with his capital at Calah. The duration of the new dynasty, known as the lower monarchy, is variously estimated at 120 or 139 years—745 to 625 or 606. The names of five out of the seven kings of the last dynasty are familiar from their occurrence in the Hebrew records. The first of these was Tiglath-pileser II. His accession (745) coincides closely with one of the great eras of history. The first Greek Olympiad began a generation earlier (776); Rome was, according to her traditions, founded eight years before (753); the Babylonian era of Nabonassar is synchronous within two years (747). Thus the last and most splendid age of the Assyrian empire coincides with the infancy of Greek and Roman civilization. The records of this Tiglath-pileser are fragmentary, for Esar-haddon, his fourth successor, undertook to destroy all the palaces of his pre-

decessor, and to use the materials for the construction of new ones of his own. The work was incomplete when the Assyrian kingdom came to an end. When Tiglath-pileser came to the throne he found all the tributary nations in a state of revolt. In reducing them he struck first at the nearest ones, Babylonia and Chaldea; these were soon reduced to submission. He then had to turn to Syria and Palestine. Hitherto the kingdom of Judah had been able to keep aloof from the quarrels of its neighbors; but now Pekah, king of Israel, and Rezin, king of Syria, entered into a league against Ahaz, the new king of Judah, who applied to Tiglath-pileser for assistance, and paid him tribute. The Assyrian reduced Syria, overran Israel, and began that series of deportations which we know as the captivities, carrying away the people of the northern districts of Israel. Ahaz was now summoned to Damascus to pay homage to his protector and to satisfy his exactions. The Hebrew chronicle records: "Ahaz made Judah naked, and Tiglath-pileser distressed him, but strengthened him not." The next Assyrian king was Shalmaneser IV., of whose short reign (727–721) no mention is found in the Assyrian records yet discovered; but from the Hebrew records we know that he carried on the war against Israel, whose king Hoshea refused to pay the tribute levied upon him. Samaria was beleaguered, and captured after a siege of three years, and her king was "cut off as the foam upon the face of the water." Shalmaneser died during this siege, leaving an infant son. The war was carried on by the *tartan*, or general-in-chief, who soon assumed the government, taking the name of Sargon, or, as the inscriptions are read, Sargina or Saryukin. This Sargon, though only once mentioned in the Hebrew records, is shown by the Assyrian inscriptions to have been a great ruler. He had to finish the war in Palestine. How he did this he tells: "I besieged, took, and occupied the city of Samaria, and carried away 27,280 people who dwelt in it. I changed the former establishments of the country, and set over them my lieutenants." A strong power was now again established in Egypt, which was trying to spread itself to the east. Sabaco, the Egyptian king, had already entered into an alliance with Hoshea of Israel, and was marching to his aid. Sargon, having taken Samaria, moved to meet Sabaco, marching down the Mediterranean coast. The encounter took place at Raphia, near Gaza. The Egyptians were defeated, and Sargon in time came into possession of all the strong places on the Phœnician coasts, though he seems to have been foiled in an attack upon Tyre. All these wars occupied a space of ten years. From them Sargon was recalled by troubles nearer home. Babylonia had asserted its independence under a king called Merodach-baladan, who sought to strengthen himself by alliances with Elam (Susiana) on the east, the Arabs, Damascus, and Judah on the west, and even with Egypt and Ethiopia. In Judah the national spirit had revived under Hezekiah, who received the messengers from Merodach-baladan with favor, and made an ostentatious display of his resources, but did not formally join the league. Sargon attacked the confederates in detail, routed the Elamites on the plains of Chaldea and marched upon Babylon, defeated Merodach-baladan, took him prisoner, and assumed his kingdoms but spared his life. He then overran Damascus, pushed down the seacoast, and sent a successful expedition over sea to Cyprus. Merodach-baladan took occasion to revolt, and recovered his throne. A conspiracy was formed at home, and Sargon was assassinated (704). His residence was originally at Calah; he rebuilt the walls of Nineveh; but his chief ambition was to replace that capital by a new city on a beautiful site 10 m. N. of Nineveh. This royal residence was named Hisr Sargina, "the house of Sargon." From the ruins of this palace, at Khorsabad, have come many of the most valuable of the Assyrian relics. Sargon was succeeded by his son Sennacherib, the greatest of the Assyrian kings (704–680). The disasters of the last few years of Sargon had reduced the dominions of his son to little more than Assyria proper. Babylonia was in open revolt. In the third year of his reign Sennacherib undertook its reconquest, which was effected in a single brief campaign. The next year he made successful expeditions against Media and Armenia. Hezekiah of Judah had renounced his allegiance to Assyria, conquered Philistia, and formed an alliance with Egypt and Ethiopia. In the fourth year of his reign (701) Sennacherib regained all Hezekiah's conquests, defeated the Egyptians, and shut up Hezekiah in Jerusalem. The Assyrian bass-reliefs are full of scenes of this war. Hezekiah offered his submission, and, according to Sennacherib, sent a tribute of 30 talents of gold, 800 of silver, and a vast quantity of other gifts. To raise this tribute he was forced to strip the temple of its treasures, and to cut off the golden ornaments from the building itself. Sennacherib, having left a detachment under his general-in-chief (*tartan*), chief eunuch (*rab-saris*), and chief cup-bearer (*rab-shakeh*) to receive the submission of Jerusalem, was besieging Lachish, then a strong town on the road to Egypt. Meanwhile a great army under Tirhakah, king of Ethiopia, was advancing to the aid of Judah. Hezekiah, encouraged by Isaiah, refused to surrender. Sennacherib broke up the siege of Lachish and moved to Libnah to meet the Ethiopians. But on the night before the day when battle was to be given occurred that great disaster, of which the Assyrian records contain no mention, but of which the Hebrew account is: "The angel of the Lord went forth and smote in the camp of the Assyrians 185,000." Whatever may have been the na-

ture of this disaster, there can be no doubt that Sennacherib looked upon it as an indication of divine displeasure; for during the remaining 20 years of his reign he made no new attempt upon Judah, although he held on to his conquests in Phœnicia. He was thereafter engaged in numerous and for the most part successful wars. Merodach-baladan again revolted, and was finally crushed in lower Chaldea. Again the combined rulers of Babylon and Elam, aided by the Arabs on the middle Euphrates, attempted to make head against Assyria, but were defeated in a great battle on the Tigris. Three times more Babylonia revolted, and at the close of the last revolt Babylon was captured and sacked (683). The annals of Sennacherib are silent as to the last three years of his reign, from which it may be inferred that they were years of disaster to his kingdom. He was assassinated in the temple of Nisroch by two of his sons, who fled to Armenia. His great work was the restoration and embellishment of Nineveh, of which his palace at Koyunjik, the most magnificent of the Assyrian ruins, was a part. Sennacherib was succeeded by his fourth son, Esarhaddon (680–667). He appears to have reconquered Babylonia, and to have been appointed viceroy. Esar-haddon is the only Assyrian king who ruled also over Babylonia during his whole reign. He pushed his conquests far and wide, extending them to Cilicia on the west and across the sea to Cyprus, and on the east he advanced into Media further than any of his predecessors had done. He overran Judah, and carried King Manasseh a captive to Babylon, which seems to have been his joint capital with Nineveh. He was the first Assyrian king who actually invaded Egypt, and assumed the title of king of Egypt and Ethiopia. He built two great palaces at Nineveh and Babylon, and began another at Calah. In this unfinished palace the slabs which line the walls were torn from the palaces of former kings, their sculptured faces placed toward the wall, and the backs smoothed preparatory to being carved with the king's own exploits. Toward the close of his reign he divided the empire, placing one of his sons as viceroy over Babylonia. Asshur-bani-pal, whom some consider the Sardanapalus of the Greek romances, ascended the throne in 667, and reigned till 660, or according to others till 647. He was also a great conqueror; but his chief glory is that during his reign, and under his patronage, Assyrian art and literature reached their highest point. He established what may properly be called a great public library. In his palace of Koyunjik were found three chambers the floors of which were covered a foot deep with tablets of clay of all sizes from an inch long to nine inches, covered with inscriptions, many of them so minute as to be read only by the aid of a magnifying glass. The letters had been punched into the moist clay, which was afterward burned. Most of these tablets were broken into fragments; but as there were four copies of each, many of them have been pieced together, so that they have been deciphered. These partially restored tablets are among the most precious of the cuneiform inscriptions, and contain the annals of the first seven years (which some suppose to be the whole) of the reign of Asshur-bani-pal. (See Cuneiform Inscriptions.) His first campaign was in Egypt, against Tirhakah, who had broken the treaty by which he had agreed to confine himself to his own country of Ethiopia. The Assyrian drove him out of Egypt, of which he took possession, but left the petty rulers in actual government. He had scarcely returned to Nineveh when these rulers allied themselves again with Tirhakah. Asshur-bani-pal went back and took summary vengeance. Memphis, Saïs, and other cities were stormed and their people put to the sword. Thebes was taken and sacked to its foundations. When Asshur-bani-pal died, Assyria seemed at the summit of its greatness. But its fall was close at hand. Of his successor nothing remains but a few bricks inscribed with a name which has been read Asshur-emit-ilin. He commenced a palace at Nimrud, the inferiority of which to earlier structures bears witness to the decline, while its unfinished state indicates the sudden downfall of the kingdom. No Assyrian records describe the fall of Nineveh or the events which led to it. Its very time is uncertain, some placing it in 625, others in 606. It is not certain that Asshur-emit-ilin was the last king, for a fragment attributed to Berosus gives Saracus as the name of the ruler under whom the kingdom fell. The account gathered from several writers is this: The Medes, having established their independence and power, made war upon Assyria. The Babylonians, Chaldeans, and Susianians revolted, and joined the Medes. Saracus sent against them his general Nabopolassar, who turned traitor, and, having betrothed his son Nebuchadnezzar to a daughter of the Median king, led the Babylonians upon Nineveh. When Saracus learned this, he burned himself in his palace, as told in the legend of Sardanapalus. Assyria ceased to be a kingdom, not even being embraced within the brief but splendid empire of Babylon, which comprised Babylonia, Chaldea, Susiana, and the region along the Euphrates. All that was properly Assyria fell to the share of the Medes.—The Assyrians were undoubtedly a homogeneous people of Semitic stock, while the Babylonians were a mixed race, embracing Hamite, Aryan, and Turanian elements. The religion of the Assyrians was apparently in general similar to that of the Babylonians, distinguished mainly by the greater predominance of Asshur, the national deity. He was the "great god," the "king of all the gods," "he who rules supreme over the gods." He was from first to last the main object of worship, never confounded with the personified or individualized deities: Sha-

mas, the sun; Sin, the moon; Nergal, the god of war; Nin, the god of hunting; Iva, the wielder of the thunderbolt; and the like. The great temple at Asshur is the only one yet discovered specially dedicated to him; from which some have inferred that instead of separate temples he had the first place in the fanes of all the other divinities. It is more probable that in Assyrian mythology he occupied the place of Brahma in that of the Hindoos. After this supreme god, the source of all being, and the supreme arbiter of all events, came a series of secondary gods, arranged in two series of double triads, male and female. The first consists of Anu, masculine, Anat, feminine—Pluto; Bel, m., Bilit, f.—Jupiter; Hea, m., Mylitta, f.—Neptune. The second triad is Sin, the moon; Shamas, the sun; Iva, the air: in this triad the moon occupies the place of precedence. Then there is a secondary group of five planetary divinities: Ninip, Saturn; Merodach, Jupiter; Nergal, Mars; Ishtar, Venus; Nebo, Mercury. This pentad in time seems to have superseded in popular esteem the older triads, Nebo, like Hermes and Mercury, being the especial patron of learning and eloquence, and the symbol of royal authority. The two triads and the pentad constituted the 12 great deities of the Assyrian pantheon, below which there was a host of inferior divinities, prominent among whom was Nisroch or Salman, the eagle-headed and winged god, whose figure appears so frequently in the sculptures. How little these religious notions served to raise the moral character of the nation, and chiefly of its rulers, is best proved by the sculptural records of the latter, whose greatest and constant boast is the successful hunting of men and beasts, the burning of cities, and flaying and mangling of captives. The monuments of Nineveh more than justify the bitterest invectives of the Hebrew prophets against "the bloody city," which was "full of lies and robbery," with "a multitude of slain" and "no end of corpses."—In certain departments of science the Assyrians attained to considerable eminence. Their system of astronomy was in advance of that of the Egyptians. They knew the synodical period of the moon, the true length of the year, and even, though not quite accurately, the precession of the equinoxes; they made it 30″ instead of 50″, so that their great cosmical year was 43,200 years instead of 26,000, its true length. They ascribed solar eclipses to their true cause, and calculated lunar eclipses with great accuracy. They must therefore have been acquainted with the golden cycle of 223 lunations, after which eclipses recur in the same order. They fixed this period at 18 years and 10 days, which is within less than 8 hours of the true period.—For further particulars relating to the geography and history of Assyria, see the articles Babylon, Babylonia, Cuneiform Inscriptions, Kurdistan, Mesopotamia, Nineveh, and Turkey. The principal authorities are: Rich's "Journey to the Site of Babylon" (London, 1839); Botta and Flandin's *Monument de Ninive* (5 vols. fol., Paris, 1849–'50); Layard's "Nineveh and its Remains" (2 vols., London, 1849), "Discoveries in the Ruins of Nineveh and Babylon" (London, 1853), and "Monuments of Nineveh" (1849, and continued for several years); Vaux's "Nineveh and Persepolis" (London, 1850); Brandis's *Ueber den historischen Gewinn aus der Entzifferung der Assyrischen Inschriften* (Berlin, 1856); M. von Niebuhr's *Geschichte Assurs und Babels seit Phul* (Berlin, 1857); G. Rawlinson's "Five Great Monarchies of the Ancient World" (vol. i., London, 1862); Oppert's *Les inscriptions assyriennes des Sargonides* (Versailles, 1863); Philip Smith's "Ancient History of the East" (London, 1870).

ASTARTE. See Ashtoreth.

ASTER (Gr. ἀστήρ, a star), a genus of plants of the great family of *compositæ*, so widespread as to induce Lindley to give its name to the whole family, *asteraceæ*. The plants popularly called asters belong to several genera, but the typical genus is by far the richest in species. Although many parts of the world, as China, the Cape of Good Hope, the Alps, and Siberia, furnish species, many of great beauty, America, and especially New England, seems most amply supplied. Of nearly 200 species cultivated in Europe, 150 are natives of North America. They are perennial herbs, with corymbed, panicled, or racemose heads; flowers radiate, the rays white, purple, or blue, and fertile, the disk yellow or reddish. In the cultivated species the disk flowers give place to repeated series of ray flowers, and assume the appearance of the well known China asters. The finest American species are: *A. Novæ Angliæ*, whose erect, narrow-leafed stem, 3 to 8 feet high, crowned with large corymbed heads of violet-purple flowers, is often seen by the roadsides; *A. puniceus*, with a purplish

China Aster, Double.

stem, serrate leaves, purple or blue flowers in panicles, found with the preceding, but taller, 6 to 10 feet; *A. lævis*, *macrophyllus*, *spectabilis*, *horizontalis*, *Californicus*, and *mutabilis versicolor*, all worth cultivating; the last two change color with age. In England they are all called Christmas or Michaelmas daisies. The Chinese pay special attention to the cultivation of many species of this genus, and the results of their skill have been introduced in America and are favorites with horticulturists. The first China asters were brought to Europe early in the 18th century. Asters require a free, rich soil, and moderate exposure to the sun. The Chinese cultivate them almost exclusively in pots. *A. argyrophyllus*, a native of New Holland, is a shrubby species, growing to the height of 10 feet; the flowers are very numerous in little heads, whitish gray with yellow disk, and smelling strongly of musk; this species is half-hardy in southern England. *A. cœlestis*, from the Cape of Good Hope, is a hothouse plant, blooming the whole year; the flowers sky-blue, disk yellow.

ASTER. I. Ernst Ludwig von, a German military engineer, born in Dresden in November, 1778, died in Berlin, Feb. 10, 1855. In 1794 he entered the corps of engineers in the Saxon army, in which his father had held high rank. He was made lieutenant in 1800, and captain in 1809. A plan made by him for the fortification of Torgau attracted the attention of Napoleon, who adopted it; the fortress was finished under Aster's superintendence, and after the Russian campaign, in which he took part, he was appointed its commander. Soon after this he left the Saxon for the Russian service. He fought at Bautzen and Leipsic, and distinguished himself by several expeditions with a detachment of Cossacks which he commanded. In 1813 he reëntered the Saxon service, and in 1814 was made colonel. In 1815 he entered the Prussian engineer corps, and took part in the battles of Ligny and Waterloo and in several sieges. In the same year he was made a general, and inspector of the Prussian fortifications. He now established his reputation as a master of his art by the construction of the great fortresses of Coblentz and Ehrenbreitstein. Of these he was appointed commander in 1825, still holding the office of inspector general. He became a lieutenant general in 1827, and in 1842 general of infantry. He was also made a councillor in 1837. He left a collection of essays and volumes, published together after his death, under the title *Nachgelassene Schriften* (5 vols., Berlin, 1856–'61). See also the work of Eiler, *Betrachtungen und Urtheile E. L. von Aster's über die politischen, kirchlichen und pädagogischen Parteibewegungen unsers Jahrhunderts* (2 vols., Saarbrücken, 1858–'9). **II. Karl Heinrich von,** brother of the preceding, born in Dresden, Feb. 4, 1782, died there, Dec. 23, 1855. He entered the Saxon artillery corps in 1796, and took part in the battle of Jena. He was soon afterward temporarily assigned to a professorship in the military school at Dresden, and was made lieutenant colonel in 1831. He retired in 1834, and received the honorary rank of colonel in 1844. He wrote many military works, and his *Lehre vom Festungskriege* (2 vols., Dresden, 1812; 3d ed., 1835) is a text book on the subject of fortifications in the Prussian military schools, and has been translated into several languages.

ASTERABAD. See Astrabad.

ASTERIAS. See Star Fish.

ASTEROIDS, a ring of small planets travelling between the orbits of Mars and Jupiter. It had long been noticed that no empirical law of planetary distances would give an account of the wide disparity between the distance separating the orbits of the earth and Mars and that which separates the paths of Mars and Jupiter. When Sir W. Herschel's discovery of Uranus in 1781 had confirmed Bode's empirical law, astronomers were led to search for a planet travelling in the orbit which, according to that law, should lie between the paths of Mars and Jupiter. On Jan. 1, 1801, such a planet was discovered by Piazzi, who called it Ceres. In March, 1802, while looking for the new planet, Olbers discovered another, travelling at about the same distance from the sun. He called it Pallas. Two others discovered before 1808 were called Juno and Vesta. In 1845 Hencke of Prussia discovered a fifth. Since then the progress of discovery has scarcely been interrupted by a single barren year. Luther in Germany, Goldschmidt in France, Watson in America, Hind in England, and De Gasparis in Italy were until 1873 the most successful asteroid seekers. Recently Prof. Peters of the Litchfield observatory, Clinton, N. Y., has shared their honors, having thus far discovered more asteroids than any other astromomer save Luther. He discovered three new asteroids in July and August, 1872, and two more in February, 1873, raising the known number to 130.

—Olbers endeavored to explain the existence of the zone of asteroids by the theory that a planet which had once travelled between the paths of Mars and Jupiter had exploded, and that the asteroids are its fragments. But Prof. Newcomb has shown, by an elaborate investigation of the asteroidal motions, that "although there are some peculiarities which might favor Olbers's hypothesis, there are a far greater number of cases which undoubtedly negative the assumption." Prof. Kirkwood has shown that when the mean distances of the asteroids are arranged in order, certain gaps can be recognized; that in fact "there are no asteroids having mean distances lying near certain definite values." He shows how these gaps by their position indicate the probability that the asteroidal zone was formed from scattered cosmical matter travelling around the sun under the perturbing influence of the planet Jupiter. Leverrier, from an analysis of the motions of Mars, has shown that the combined mass of all the aste-

roids probably falls far short of one fourth of the earth's mass. More than a third of the known asteroids have been discovered in the two months April and September, and less than a third in the six months January, February, June, July, November, and December.

ASTHMA (Gr. ἄσθμα, from ἀεἰν, to blow), a disease characterized by an extreme difficulty of respiration, which is worse at certain seasons of the year and particular periods of the day, being generally most severe at night. The difficulty of breathing is increased by violent emotions, damp atmosphere, excess of any kind, strong exercise, running, walking quickly, or ascending a flight of stairs. It is also more laborious in a horizontal position, and hence more distress is felt in bed at night; the warmth of the bed also excites increased secretion of the mucous follicles, and this blocks up the air passages more completely, causing paroxysms to be more frequent than during the day. The patient seeks relief by sitting upright in bed, or bending his body forward, and endeavoring to expand the chest mechanically by every possible means. Old persons are more liable to the diease than young. Some writers describe the disease mainly as a nervous affection; others as the result of organic lesion of the heart and blood vessels; while others again attribute it to dilatation of the air vesicles of the lungs. All these and many other complications may exist. It is now believed that spasmodic asthma is caused by a spasm of the muscular fibres encircling the bronchial tubes, especially the smaller branches. The existence of these fibres is placed beyond a doubt by microscopic examination. In common asthma the lining membrane of the air passages is more or less affected as in chronic bronchitis, but the affection of the mucous membrane extends further down into the lungs, the air cells are more obstructed, and the conformation of the chest itself is often somewhat contracted and defective. The action of the diaphragm is imperfect, as well as that of the walls of the chest; and hence it is that, from want of innervation and free action in these parts, the disease is commonly deemed nervous, as distinguished from chronic bronchitis, which affects the bronchial mucous membrane chiefly. In spasmodic asthma, the nerves are still more deeply implicated; their action seems defective in the respiratory organs, as stammering shows imperfect nervous action in the organs of speech; and in both cases the difficulty is increased by physical or moral excitement. Chronic asthma seldom shortens life, where patients carefully avoid all violent emotions, exercise, and excess, although spasmodic paroxysms may endanger life at any time where these precautions are neglected. Attacks of spasmodic asthma generally occur during the first sleep, soon after midnight, or very early in the morning. The patient suddenly awakes with a sense of suffocation, tightness of the chest, and difficulty of breathing. The respiration is wheezing and laborious, the shoulders are raised, and every effort made to enlarge the chest. The pulse is usually quick, weak, and irregular; the lower extremities cold. When cough and expectoration come on, the patient is relieved. The spasm, however, may continue half an hour or more, and even as much as three or four hours.—Asthma is often complicated with diseases of the heart or with chronic bronchitis, acting as a source of permanent congestion, predisposing the parts to be more easily thrown into a state of spasm. Sometimes severe attacks of dry catarrh are aggravated by spasm, as in the "bronchial asthma" of Andral.—The most common consequences or concomitants of the disease are chronic inflammation and dilatation of the bronchi; emphysema and œdema of the lungs; hæmoptysis; tubercular deposits; hypertrophy and dilatation of the cavities of the heart; effusions into the pericardium, the pleura, and sometimes congestion and effusions in the head, giving rise to coma or apoplexy. The treatment of the paroxysm consists in administering narcotics and antispasmodics, to be given if possible as soon as the first sensations are felt. Strong coffee, laudanum, and ether are among the best; and stramonium smoked as tobacco is often very useful, but should be used with caution where the heart is diseased. Those medicines are most effectual which produce expectoration.

ASTI (anc. *Asta Pompeia*), a city of N. Italy, in the province of Alessandria, 36 m. by rail E. S. E. of Turin; pop. in 1872, 31,033. In the middle ages it was the capital of the republic of Asti, which maintained its independence from 1098 to 1155, in which latter year the city was burned by Frederick Barbarossa. Old walls surround it, and it contains several celebrated buildings. Near the city is made the wine which bears its name. Asti is the birthplace of Alfieri.

ASTIÉ, Jean Frédéric, a French writer, born in 1822. He was for some time pastor in New York city, and subsequently professor of philosophy at Lausanne. Among his works are: *Le réveil religieux des États-Unis*, 1857–'8 (Lausanne, 1859), and *Histoire de la république des États-Unis depuis l'établissement des premières colonies jusqu'à l'élection du président Lincoln*, 1620–1860 (2 vols., 1865).

ASTLEY, Philip, an English equestrian, born at Newcastle-under-Lyne in 1742, died in Paris, Oct. 20, 1814. He served seven years in the light horse, and receiving an honorable discharge supported himself for some time by exhibitions of horsemanship. He at length acquired sufficient means to build a circus or amphitheatre, which he conducted successfully for many years, though it was several times partially burned and rebuilt. In 1804 he leased it to his son. He also built for his own use 19 theatres in London, Paris, and Dublin, and in connection with Antoine Franconi assisted to establish the "Olympic Circus." He pub-

lished "Remarks on the Duty and Profession of a Soldier" (1794); "Description and Historical Account of the Places near the Theatre of War in the Low Countries" (1794); "Astley System of Equestrian Education" (1801).

ASTOLPHUS, or **Astulphus,** called by the Germans Aistulf, king of the Lombards in northern Italy, succeeded his brother Rachis in 749, and died in 756. After having seized the exarchate of Ravenna, he threatened Rome. Pope Stephen II. fled to France and demanded aid from King Pepin, who crossed the Alps in 754 with an army, defeated Astolphus, and besieged Pavia. The Lombard obtained peace on condition of surrendering Ravenna and all his other conquests; but on Pepin's withdrawal he burst forth again, laid siege to Rome, and ravaged all the surrounding country. The pope again supplicated Pepin, who crossed the Alps and shut Astolphus up in Pavia. Astolphus was preparing for a new war, but fell from his horse while hunting, and died three days afterward without leaving male heirs.

ASTOR, John Jacob, a merchant of the city of New York, born at Walldorf, near Heidelberg, July 17, 1763, died in New York, March 29, 1848. He was the youngest of the four sons of a peasant, and his boyhood was passed in work upon his father's farm. Two of his brothers had left their home, one of them to establish himself as a maker of musical instruments in London, and the other to settle in America. At the age of 16 Astor accepted an invitation from the former to join him in his business, and he, walking to the coast of Holland, embarked for London in a Dutch smack. In London he worked industriously till 1783, when, a few months after the recognition of the independence of the United States by Great Britain, he sailed for Baltimore, taking with him a few hundred dollars' worth of musical instruments to dispose of on commission. On the voyage he made acquaintance with a furrier, in accordance with whose suggestions he exchanged his musical instruments in New York for furs, with which he hastened back to London, where he disposed of them to great advantage. He soon returned to New York and established himself there in the fur trade, prospering so fast that in a few years he was able to send his furs to Europe and the East in his own ships, which brought back cargoes of foreign produce to be disposed of in New York. At the beginning of the century he was worth $250,000, and he now began to revolve colossal schemes of supplying with furs all the markets of the world, and of planting towns and spreading civilization in the wilds of the western continent. It was his aim to organize the fur trade from the lakes to the Pacific by establishing numerous trading posts, making a central depot at the mouth of the Columbia river, and then, by obtaining one of the Sandwich islands as a station, to supply the Chinese and Indian markets with furs sent directly from the Pacific coast. In prosecuting this gigantic scheme it is said that he expected only outlay during the first 10 years, and unprofitable returns during the second 10, but after that a net annual result of about $1,000,000. The settlement of Astoria was founded in 1811, but the scheme was never fully carried out. Astor early began to make investments in real estate in New York, and in the rapid growth of the city the value of some portions of his property nearly centupled. He erected many handsome private and public buildings. His fortune has been estimated at $20,000,000. During his whole career he hardly made a misstep through defect of his own judgment, and his memory retained for years the minutest details. He lived during nearly a quarter of a century in retirement, in the society of his family and of eminent practical and literary men, his mind retaining its vigor after his bodily strength had become greatly enfeebled. He gave many liberal donations during his lifetime, and his will contained numerous charitable provisions. One of these was $50,000 for the benefit of the poor of Walldorf, his native village. Among his most useful bequests was that of $400,000 to found the Astor library in the city of New York, the fruit of a long cherished purpose, and of much consultation in the latter part of his life. (See ASTOR LIBRARY.)

ASTORGA (anc. *Asturica Augusta*), a city of Spain, in the province and 30 m. by rail W. S. W. of Leon, is situated on an elevated plain 2 m. from the river Tuerto; pop. 5,000. It is surrounded by ruined walls, and has an ancient Gothic cathedral with a high altar of great beauty, an old castle, and some Roman remains. Napoleon made Astorga his headquarters during the pursuit of Sir John Moore, at the beginning of 1809. In 1810 it was taken after an obstinate defence by Junot, and in 1812 retaken by the Spaniards.

ASTORGA, Emmanuele d', a Sicilian musical composer, born at Palermo, Dec. 11, 1681, died in Bohemia, Aug. 21, 1736. His father, a Sicilian of rank, in command of a band of mercenary troops, resisted the union of Sicily with Spain; but his soldiers betrayed him, and he was executed in the presence of his wife and son. The former immediately died of grief, and Emmanuele was for a time almost idiotic and helpless. Recovering, he entered a convent at Astorga, from which town he took his surname. Here he speedily developed a remarkable musical talent, and in 1704 became a court musician and composer at Parma. Soon afterward he attached himself to the suite of the emperor Leopold, and after his death in 1705 travelled extensively, but at last entered a convent in Bohemia, where he spent the remainder of his life. His principal work is his *Stabat Mater*, of which the original MS. is preserved in the library of Oxford.

ASTORIA, a town of Clatsop county, Oregon, near the mouth of the Columbia river; pop. in 1870, 639. It was for a long time the depot of the fur trade for all the country west of the

Rocky mountains, and was formerly a port of entry. The difficulties in the entrance to the Columbia have, however, opposed a great impediment to its development. It was founded by the Pacific fur company in 1811, and named in honor of John Jacob Astor, the chief proprietor. Its early history is described by Washington Irving in his "Astoria."

ASTOR LIBRARY, an institution founded under the will of John Jacob Astor, who bequeathed $400,000 "for the establishment of a public library in the city of New York." By a provision of the will, the government of the library was vested in 11 trustees, in whose keeping were placed all the property and effects of the institution; in them existed all power to invest and expend the funds, and to manage the affairs of the library. Among the first trustees named by the testator were Washington Irving, William B. Astor, Joseph G. Cogswell, Fitz-Greene Halleck, besides five other gentlemen, and the mayor of New York and the chancellor of the state *ex officio*. By a subsequent codicil, Charles Astor Bristed, the testator's grandson, was appointed an additional trustee. A provision of the will designated, as the land whereon to erect a suitable building for the purposes of the library, a lot situated upon the east side of Lafayette place, measuring 80 ft. in front by 120 ft. deep. As early as 1839 Mr. Astor had purchased a number of volumes, aided by Dr. Cogswell, with the ultimate intention expressed in his will. In May, 1848, the trustees of the library met for the first time, and in accordance with the desire of Mr. Astor, appointed Dr. Cogswell superintendent. He went to Europe in the autumn of 1848, authorized to purchase books to the amount of $20,000. During an absence of four months he collected 20,000 volumes, which were temporarily placed in a building rented for the purpose. A second and third visit by the superintendent increased the number of volumes to 70,000, with which the first building was opened, Jan. 9, 1854. The Astor library is built in the Byzantine style of architecture, richly ornamented with brown stone mouldings and an imposing entablature. Its dimensions are in accordance with Mr. Astor's will, the height being about 70 ft. The library room is 100 ft. in length by 64 in width, and 50 in height; this is reached by a flight of 36 marble steps. The lower rooms are chiefly used for the deposit of public documents and for the meetings of the trustees. Since the erection of this building the number of volumes has increased to nearly 150,000, not quite filling the second building, which has since been erected. The books are arranged according to subjects. In the selection of books Dr. Cogswell, upon whom devolved the whole of this labor and responsibility, chose only such works as his experience and knowledge of bibliography taught him would be most useful to a young and growing country. Particular attention was paid to the department of technology, in which the library is unusually rich. Bibliography also received a large share of Dr. Cogswell's attention, his own private collection having been early added to the library. It is designed to render the department of American history as full as possible, as works of this class are more and more required by the American public. In linguistics, particularly oriental, the Astor library is unsurpassed by any in this country. The natural sciences are also fully represented, comprising about 7,000 volumes, many of them rare and costly. In January, 1856, the first building having become filled, and the necessity for more room obviously existing, Mr. William B. Astor, eldest son of the founder of the library, made a donation to the trustees of an adjacent piece of land 80 ft. wide and 120 ft. deep. Upon this a building similar to the first was erected in 1859, and formally opened to the public on the 1st of September in that year. Both edifices, capable of containing 200,000 volumes, will soon be filled. In December, 1866, William B. Astor made a further donation to the library of $50,000, $20,000 of which he directed to be expended in buying books, and the remainder to be added to the general funds of the library. The catalogue of the Astor library, as prepared by Dr. Cogswell, comprises five octavo volumes of 500 pages each, four volumes containing the alphabetical list of authors' names, the fifth the supplemental list up to 1866, and the analytical index of subjects to the whole. The present superintendent is Dr. E. R. Straznicky, formerly first assistant librarian, his two predecessors, the late Dr. Cogswell and Mr. Francis Schroeder, having resigned, the former Jan. 1, 1862, and the latter July 1, 1871.

ASTRABAD, or **Asterabad.** **I.** A northern province of Persia, lying along the S. coast of a large bay of the same name, which forms the S. E. extremity of the Caspian sea. The surface is generally hilly, but near the principal rivers, the Gurgan and the Attruk, are considerable plains. The soil is fertile, and excellent fruit is everywhere produced. Large parts of the province, especially the plains near the rivers, form the favorite camping grounds and cattle pastures of the Goklan, Yamud, and other nomadic tribes. The climate is mild and equable. **II.** A town, capital of the preceding province, in lat. 36° 50′ N., lon. 54° 45′ E., 15 m. S. E. of the Caspian sea, and 190 m. E. N. E. of Teheran; pop. about 10,000. A wall about two miles in circumference encircles it. The buildings are low and insignificant, and the trade and industries are unimportant. The town is exceedingly unhealthy, as the marshes and bodies of water near it send up malarious vapors of the most dangerous character. It is commonly known as "the city of the plague," and in the summer is almost deserted by its inhabitants. Astrabad was formerly the residence of the Kajar princes, the ancestors of the present Persian dynasty.

ASTRÆA (Gr. *ἀστραία*, starry), a genus of radiate animals of the polyp family, which attach themselves to marine bodies, and are often found collected together into a globular or hemispherical mass, known as one of the forms of coral. The upper surface of these masses is entirely covered with little cavities of stellar form, each one of which is the receptacle of a polyp, and in the centre is its mouth, from which radiate its numerous tentacula or arms. These cavities are either in close contact or separated by intervening spaces; and this feature is made the basis for dividing the genus into two sections, the first of which is represented by the common East India species, *A. favosa*, and the other by the *A. rotulosa* of the West Indies.

ASTRAKHAN, or **Astrachan.** **I.** A government of S. E. Russia, on the N. W. shore of the Caspian sea; area, 85,010 sq. m.; pop. in 1867, 573,954, including 134,000 Kirghizes. The Volga, flowing from N. W. to S. E., divides it into two arid steppes of nearly equal size, with a few fertile tracts, pasture lands, and grain fields along the banks of the river. The whole country seems to have once been covered by the Caspian, and the soil abounds with saline ingredients. Salt lakes and marshes are abundant. Rock salt and gypsum are found. There are few trees. The climate is extremely hot in summer and cold in winter, and unwholesome to strangers. Cattle, goats, and a poor breed of horses are raised, and the goat skins are used for the manufacture of morocco leather. The most valuable industry is fishing, the fisheries of the Volga being extraordinarily productive. The principal rivers besides the Volga are the Akhtuba, Sarpa, and Kuma. The most important towns, besides the capital, are Krasnoi-Yar, Tchernoi-Yar, and Tzarev. The population is composed of Kalmucks, Kirghizes, Tartars—these three being nomadic tribes—and Russians, Armenians, Persians, Hindoos, and Germans. Astrakhan was anciently a khanate of the Golden Horde of Tartars, and embraced, besides Astrakhan proper, Saratov, Orenburg, and the Caucasus. It was annexed to Russia by the czar Ivan the Terrible in 1554. **II.** The capital of the preceding government, situated on an island formed by one of the branches of the Volga, about 20 m. from the sea; pop. in 1867, 47,839. The houses are partly of brick, partly of wood, and the streets are crooked, unpaved, and dirty. The population is composed of all nations of Europe and Asia, and of nearly all creeds. There are mosques for the Mohammedans and sanctuaries for the Hindoos, as well as Christian churches. The city has a naval academy, several public schools, a Greek theological seminary, Greek and Armenian archbishops, and a printing office for the Kalmuck language. About 100 small manufacturing establishments produce cashmere shawls, silk and cotton fabrics, furs, dyes, powder, and salt. The salt works are very extensive, and its fisheries in the Volga and Caspian are, next to those of Newfoundland, the most important in the world. Astrakhan is an entrepot of the Russian oriental trade, and the raw produce from the remoter regions, consisting principally of hides, sheepskins, and grease, is brought there. The Volga is its great channel of inland navigation, and in 1863 its imports were valued at $997,976, and its exports at $215,448. The trade of the Caspian, with Astrabad and other Persian ports on the S. and Tartary on the E., belongs almost wholly to Astrakhan and Baku. The harbor of Astrakhan, however, is much obstructed by sand.

ASTRINGENTS (Lat. *astringere*, to bind), agents which have the power to contract the animal tissues, diminish the amount of their fluids, and increase their density. They seem to act partly by a direct coagulation of albuminous and gelatinous structures, and partly by diminishing the size of the blood vessels and consequently the amount of blood. An example of the first mode is seen in the formation of leather by tanning, which, however, is a degree of action far beyond what can take place in the living body. Astringents diminish both the absorbing and secreting functions of mucous membranes, and coagulate the secretions already formed. They excite a peculiar feeling of dryness and puckering in the mouth. They are used to check bleeding and excessive discharges from mucous membranes, to promote the healing of ulcerated surfaces, and to restore lax and flabby tissues to their normal firmness. Some of them are absorbed, and, after passing through the blood, are excreted by the kidneys.—The vegetable astringents, nutgalls, oak and hemlock bark, kino, catechu, rhatany, logwood, crane's-bill, *uva ursi*, wintergreen, and a large number of others, contain more or less of the different forms of tannic and gallic acids. The chief mineral astringents are acetate of lead, the different alums, persalts of iron, nitrate of silver, and the sulphates of copper and zinc. Some astringents, as tannic acid, alum, and lead, find a useful application in the arts of dyeing and tanning.

ASTROLOGY (Gr. *ἄστρον*, star or constellation, and *λόγος*, discourse), a system of rules for discovering future events by studying the positions of the heavenly bodies, which was received for ages as a science, but has now lost all credit in civilized nations. It was divided into two kinds: judicial, by which the fate and acts of men and nations might be foreknown; and natural, by which the events of brute and inanimate nature, such as the changes of the weather, &c., might be predicted. The etymological meaning of the word astrology is almost the same as that of astronomy; and there was no clear distinction made between the two branches until the time of Galileo. Previously, most students of the movements of the heavenly bodies had been more or less astrologers. The invention of the telescope and the general establishment of the Copernican system

first gradually displaced astrology for the benefit of true scientific knowledge.—Astrology was early developed in Egypt, but chiefly flourished in Chaldea, whose "star-gazers and monthly prognosticators" were so famous that the name Chaldee came to be used as identical with astrologer, not only in the Scriptures, but also by the classical writers. In the East it still has its votaries. It was much practised in imperial Rome. It was forbidden by Augustus, and the edict was often reënacted by later emperors, but was apparently not much regarded. The Arabs revived astrology with astronomy. The Moors in Spain held it in great respect, and by their influence it was made popular among the Gothic nations of western Europe. The astronomical tables of Alfonso X. in the 13th century were in great part intended for astrological purposes. Astrology continued to increase in credit till the middle of the 16th century, was still practised at European courts at the end of the 17th, and had a few votaries till the end of the 18th, even in England. It was in high repute at the court of Catharine de' Medici; it was considered a science even by Kepler; and Lilly, the last of the famous astrologers, was called before a committee of the house of commons in the reign of Charles II. to give his opinion of future events.—The general method of procedure in finding the fate of any man or enterprise was to draw a horoscope, representing the position of the stars and planets, either in the whole heaven, or within one degree above the eastern horizon, at the time of birth of the individual or the inception of the undertaking. Arbitrary significations were given to different heavenly bodies, as they appeared singly or in conjunction; and according to these significations, the horoscope was interpreted. The presence of Venus foretold love; Mars, war; Jupiter, power; the Pleiades, storms at sea, &c. The system of a reputable astrologer in the 16th century required years for its mastery; and absurd as its fundamental principles now appear, its details were not inconsistent with each other, and the whole system has a completeness which appears very singular in a scheme so visionary.

ASTRONOMY (Gr. ἄστρον, a star, and νόμος, law), the science which deals with the movements, distribution, and physical characteristics of the heavenly bodies. That astronomy is the most ancient of all the sciences, save agriculture, can scarcely be questioned. In the earliest ages men must have required measures of time, and such measures could only be obtained from the study of the motions and appearances of the celestial bodies. The origin of astronomy has been referred to several nations. The evidence in favor of the Chaldeans seems on the whole the strongest. We find in Ptolemy's Almagest the records of observations of considerable accuracy made at Babylon at a very early epoch. Some of the observations which were transmitted to Aristotle by Callisthenes were made about 2250 years B. C. The Chaldean investigations of the motions of the moon were in many respects remarkable. In particular their invention of the saros indicates not merely very accurate observation and a careful discussion of the results, but considerable ingenuity. They were also acquainted with the art of dialling; they had discovered the precession of the equinoxes, and had determined the length of the tropical year to within less than half a minute of its true value. There are even reasons for believing that they were acquainted with the true system of the universe; and we learn from Diodorus Siculus and Apollonius Myndius that the Chaldean astronomers regarded comets as bodies travelling in extended orbits, and even in some instances predicted the return of these objects. Indian astronomy does not appear to have been by any means so accurate as that taught by the Chaldeans. The Indian system seems indeed to have belonged to a more northerly latitude than Benares, the chief seat of Hindoo learning. Accordingly M. Bailly was led to ascribe the origin of the system to a nation which had inhabited higher latitudes; and he even went so far as to invent a nation for the occasion, the Atlantides, and to ascribe to that apocryphal nation a wholly incredible degree of learning. It may be inferred that the want of agreement between celestial phenomena in India and the Indian system of astronomy, instead of justifying M. Bailly's argument, shows rather that the Indian astronomers were but imperfectly acquainted with the phenomena of the heavens. Nor is it easy to accept the opinion of Prof. Smyth, astronomer royal for Scotland, that the ancient Egyptians, the architects of the great pyramid, were acquainted with all the facts which he conceives to have been symbolized in that remarkable edifice. That the pyramid was erected for astronomical purposes may be admitted; and we may accept Prof. Smyth's conclusion that the building of the pyramid corresponded to the time when the star *a* Draconis at its upper transit was visible (as well by day as by night) through the long inclined passage which forms one of the characteristic features of the pyramid. This would set the epoch about the year 2170 B. C. And it is a remarkable fact that, as Prof. Smyth points out, the Pleiades were at that time in a most peculiar position, well worthy of being monumentally commemorated; "for they were actually at the commencing point of all right ascensions, or at the very beginning of running that great round of stellar chronological mensuration which takes 25,868 years to return into itself again, and has been called elsewhere, for reasons derived from far other studies than anything hitherto connected with the great pyramid, the 'great year of the Pleiades.'" But although we may thus set the astronomical system of the early Egyptians in a far antiquity, it seems unsafe to follow Smyth in believing that the builders of the great pyramid were acquainted with

the sun's distance, with the true length of the precessional period, and with other astronomical elements the discovery of which has rewarded the exact methods and the profound mathematical researches of modern times.—As to Chinese astronomy, we have abundant evidence to show that it was inexact, though undoubtedly very ancient. Its antiquity may be inferred from the circumstance that the emperor Chwen-hio adopted as an epoch a conjunction of the planets Mercury, Mars, Jupiter, and Saturn, which has been shown by M. Bailly to have occurred no less than 2449 years B. C. In a remarkable work on the subject of Chinese astronomy, recently published by Mr. Williams, assistant secretary of the astronomical society of England, we are told that the instruments at present used by Chinese astronomers, as well as their principal methods of calculation, were introduced by Jesuit missionaries. Yet the ancient Chinese must have possessed some familiarity with the celestial motions. They could calculate eclipses; for we learn that "in the reign of the emperor Chow-kang, the chief astronomers Ho and Hi were condemned to death for failing to announce a solar eclipse which took place 2169 B. C.;" a clear proof that the prediction of eclipses was a part of the duty of the imperial astronomers. The Chinese were also acquainted with the Metonic and Callippic cycles.—The earliest Greek school of astronomy was that founded by Thales of Miletus (600 B. C.) and termed the Ionian school. Thales appears to have been acquainted with the motions of the sun and moon, with the explanation of seasonal changes, and with the length of the year. It has been said that he taught mariners to regard the Lesser Bear rather than the Greater as the polar constellation; but Manilius ascribes the selection of the Lesser Bear as the cynosure to the Phœnicians. To Pythagoras, who also belonged to the Ionian school, a knowledge of the true theory of the earth has been ascribed, though on insufficient grounds. According to the statement of his pupil Philolaus, he taught that "the earth and planets move in oblique circles (or ellipses) about fire, as the sun and moon do"—a statement which certainly does not as it stands indicate exact knowledge respecting the constitution of the solar system. Nicetas of Syracuse is said in like manner to have taught that the diurnal motions of the celestial bodies are caused by the rotation of the earth upon her axis. "Theophrastus," says Cicero, "narrates that Nicetas of Syracuse held that the sun, moon, and stars are at rest, and the earth alone moves, turning about its axis, by which the same phenomena are produced as if the contrary were the case." Eudoxus of Cnidus first endeavored to explain the looped paths of the planets, solving the problem by the invention of the theory of concentric spheres.—But it was by the Alexandrian school, founded under the Ptolemies, that exact and systematic observation of the celestial bodies was first undertaken. Hipparchus of Nicæa (160 B. C.) surpassed all the astronomers of antiquity in skill and acumen. He made the first catalogue of the stars, and was the first to calculate the motions of the sun and moon. He also made a series of observations of the planets, and represented their motions by the famous theory of epicycles—a theory which, though unsound, was in so far in advance of previous ideas, that it was intended to be brought into comparison with the real motions of the celestial bodies. Hipparchus also invented plane and spherical trigonometry. Ptolemy is another distinguished member of the Alexandrian school. Some of the theories and observations which have been ascribed to him were indeed due to the labors of Hipparchus. Thus the Ptolemaic system of astronomy was wholly based on the theories of his predecessor; and the star places indicated in his works seem to have been simply deduced from Hipparchus's catalogue of 1,081 stars by introducing a correction for precession. Yet Ptolemy's labors were unquestionably important. He detected the inequality in the moon's motions called the evection, and was the first to recognize the effect of refraction in altering the apparent places of the heavenly bodies. His work, the Almagest (or the Syntaxis), contains nearly all that we know of the astronomy of the ancients. The school of Alexandria ceased to exist when Egypt was invaded and conquered by the Mohammedans, and the celebrated Alexandrian library destroyed, in the 7th century. The Arabians, however, formed no contemptible astronomers. They even surpassed the Greeks in the department of practical astronomy; and they handed down to the Europeans the system which they had derived from their predecessors.—In the 13th century European astronomy may be said to have had its origin or revival, though nearly two centuries elapsed before any important advance was effected. Toward the close of the 15th century the labors of Purbach and Regiomontanus prepared the way for the work of Copernicus, the founder of the true system of astronomy; while Waltherus revived the art of astronomical observation, and thus indirectly supplied the means of establishing the theories of Copernicus, Kepler, and Newton. Copernicus (born in 1473) found that by placing the sun instead of the earth at the centre of the scheme, there resulted a simple and rational explanation of all the chief motions of the planets. He was not able to show, however, that the epicycles of Hipparchus and Ptolemy could be wholly removed. Accordingly, many astronomers, who might have been attracted to the Copernican system if it could have been presented as it is known in our day, were found in the ranks of its opponents. Among these was Tycho Brahe, the Dane, who pointed out that the apparent fixity of the stars is opposed to the Copernican theory, unless the distances of all the stars be assumed to exceed enormously the distance of the earth

from the sun. He therefore adopted a modification of a system once held by the Egyptians, regarding the earth as the centre around which the sun revolves, while the planets revolve around the sun as a subordinate centre. Although this was a retrogression, astronomy owes a debt of gratitude to Tycho Brahe for the observations by which he endeavored to put the Copernican theory to the test. His observations of Mars, in particular, enabled Kepler to remove for ever from astronomy the cycles and epicycles, centrics and eccentrics of the old systems. Endeavoring to explain the motions of Mars on the Copernican theory, Kepler found himself baffled so long as he adhered to circular and uniform motions so combined as to produce epicyclic paths. He was thus led to try whether the ellipse would better explain the movements of Mars. After long and patient study he was able in 1609 to establish his first two laws, and nine years later his third law. The three laws are as follows: 1. Every planet describes an ellipse about the sun, this orb occupying one focus of each such ellipse. 2. If a line be supposed continually drawn from the sun to any given planet, this line will sweep over equal areas in equal times. 3. The squares of the periodic times of the planets are proportional to the cubes of their mean distances. In the mean time the telescope had been invented, and when less than one year had passed after the publication of the first two laws of Kepler, Galileo had made a series of observations tending to illustrate if not even to demonstrate the truth of the Copernican system. In particular his discovery of the satellites of Jupiter, and the recognition of the motions of these orbs around their primary, was felt even by the enemies of the new theory to be strikingly in its favor. Here was a system in which the motions of the earth and planets around the sun seemed pictured in miniature. The discovery of the phases of Venus was also regarded as a serious blow to the Ptolemaic system. The invention of the telescope supplied also the means of determining the places and therefore the motions of the celestial bodies with a degree of accuracy which had hitherto been unattainable. Hevelius indeed endeavored to make a stand against the innovation, adhering until the end of his career to the methods used by the ancients. But gradually the telescope prevailed, and the way was thus prepared for the researches of Newton, whose discovery of the law of gravitation would never have been admitted but for the evidence in its favor attained by means of telescopic observations. In particular, the measurement of the earth's dimensions with the requisite accuracy could not have been accomplished without telescopic observations of star places; and Newton would have been unable to show that the moon is retained in her orbit by the same force which draws objects to the earth's surface, had not accurate measurements of the earth been obtained by Picard. We know in fact that Newton was led by erroneous ideas of the earth's dimensions to abandon the theory of gravitation for nearly 20 years. Returning to his researches in 1680, when news of Picard's results had reached him, Newton was able to establish the theory of gravitation on a firm and stable basis. He showed that the moon is drawn to the earth by terrestrial gravity, diminished at the moon's distance in the same degree that the square of that distance exceeds the distance of points on the earth's surface from the earth's centre. He proved that when the force of attraction diminishes according to the law of the inverse square, the attracted body will obey all the laws of Kepler in its motions around the attracting orb. Then he extended his inquiries to the mutual perturbations of bodies so moving. Taking the moon as an instance of the effects of perturbation, he showed how several peculiarities in her motions which had hitherto seemed inexplicable are caused by the sun's perturbing action on the moon, that is, by the excess or defect of his action on the moon in different parts of her orbit, as compared with his action on the earth. Pursuing his researches, he showed how the precession of the equinoxes can be accounted for by the law of gravitation; he formed and discussed two theories of the tides; he solved the problem presented by the oblateness of the earth's figure. Half a century passed before any attempts were made to extend the reasoning of the *Principia*, or to develop the views of its author. During this half century British mathematicians were chiefly engaged in defending, continental mathematicians in attacking, the principle of universal gravitation. But in 1745 Euler and Clairaut began to apply the new methods of mathematical analysis to the problems discussed by Newton. Clairaut succeeded in explaining the lunar evection, which had foiled Newton; and this success encouraged continental astronomers to devote their powers to the investigation of the problems presented by the celestial motions. They mastered one after another the difficulties of the lunar and planetary perturbations. The analytical researches of Lagrange and Laplace, and in particular the discovery (independently made by both) of the great laws on which the stability of the planetary system depends, are only inferior to the discovery of the law of gravitation itself in interest and importance. It would be difficult to say which of these two geometers displayed the greater powers of analytical research. If the genius of Lagrange was the more profound, yet Laplace's labors led to more important practical results, and in discovering the real interpretation of the "long inequality" of Jupiter and Saturn he mastered a problem which had foiled his great rival. Yet another noble achievement of Laplace's must be mentioned—his interpretation of the secular acceleration of the moon's mean motion. In recent times it has been shown indeed by

Adams that Laplace's investigation of the subject was imperfect; yet undoubtedly he placed his finger on the true cause of that part of the acceleration which is due to the ordinary forms of perturbation, nor has the cause of the remaining part of the moon's acceleration been hitherto ascertained. Finally, we may regard the publication of his *Mécanique céleste* as forming a veritable epoch in the history of physical astronomy. Passing over many important contributions to the theory of gravitation, we may point to the achievement of Adams and Leverrier in the discovery of the planet Neptune as perhaps the most conclusive of the evidences yet adduced in support of Newton's theory. A planet hitherto unseen was made known to us, not as in the case of Uranus by a happy chance, but by a study of the deviations of a known planet from the path calculated for it by mathematicians. It may be added that the discovery of Neptune led to the recognition of the mastery which American astronomers and mathematicians had obtained over the more recondite departments of analysis. It has been remarked by Prof. Grant of Glasgow that "the results which have been deduced from Bond's observations of the satellite of Neptune, and the mathematical researches of Walker and Peirce, unquestionably exhibit a degree of consistency with the actual observations of Uranus and Neptune which has not been paralleled by any similar efforts in Europe; while at the same time they tend to throw much interesting light on the theory of both planets." Among the more recent contributions to the mathematics of astronomy must be mentioned Adams's discussion of the moon's secular acceleration and the researches to which that discussion led, Delaunay's extension of the lunar theory, and the inquiries of Prof. Newcomb into the same subject.—While mathematical astronomy had been thus advancing, observational astronomy made similar progress. The discovery of Saturn's ring and largest satellite by Huyghens was soon followed by the discovery of four other satellites. Later Sir W. Herschel discovered two other Saturnian satellites, while in comparatively recent times Bond in America and Lassell in England discovered an eighth. Uranus was added to the planetary system by Sir W. Herschel in 1781, and at sundry times four Uranian satellites have since been discovered, while four others are by some supposed to have been seen by Sir W. Herschel. Neptune and his satellite constitute two other known members of the planetary scheme. But to these must be added 130 small planets (see ASTEROIDS) which travel between the paths of Mars and Jupiter; while the observations and researches of Bond and Peirce in America and Maxwell in England tend to show that the rings of Saturn are composed of multitudinous small satellites. Apart from these discoveries, the complexity of the scheme ruled over by the sun has been indicated by the discovery of the fact that multitudes of meteoric systems exist within the confines of the solar domain, and that the component members of these systems must be counted by millions. The recent observations of Profs. Newton and Kirkwood in the United States, Prof. Alexander Herschel and Mr. Glaisher in England, Quetelet in Belgium, Schmidt in Athens, Heis in Germany, and Secchi in Rome, have added largely to our knowledge respecting meteors; while the mathematical researches of Schiaparelli, Adams, Leverrier, and others, have revealed the interesting fact that these bodies are intimately associated with comets.—The telescopic study of the starry depths, though it has been prosecuted laboriously by the Herschels, Struve, Argelander, Mädler, and others, must be regarded as still (owing to the vastness of the domain to be explored) in its infancy. The elder Herschel first conceived the daring idea of gauging the celestial depths; but as a matter of fact the regions surveyed by the two Herschels amount to but a minute portion of the heavens. On the other hand, though Argelander's survey extended over a complete hemisphere, yet the telescopic power employed was but small. Dr. Gould, an American astronomer, is extending Argelander's system of survey to the southern heavens; and the result cannot fail to be of the utmost interest and value. We owe to the Herschels nearly all our present knowledge of the strange objects called nebulæ or star cloudlets. Of these only 16 were known in Halley's time, and barely 200 when Sir W. Herschel began his telescopic labors. He and his son added between them nearly 5,000 nebulæ to the list of known objects of this class. At present some 5,700 nebulæ are known in all.—The theoretical considerations by which the Herschels have endeavored to interpret the scheme of the universe are too important to pass unnoticed in this brief sketch of the history of astronomy. They have presented the galaxy to our contemplation as a scheme of suns, many equalling and many surpassing our own sun in magnitude and splendor, while they have taught that many of the star cloudlets are schemes of suns resembling the galaxy in extent and constitution. If some, as Whewell, Herbert Spencer, and others, do not regard these views as demonstrated or even demonstrable, yet we cannot but contemplate with admiration the activity of mind which enabled the Herschels, after completing unrivalled series of observational researches, to propound theories so magnificent respecting the myriads of orbs which they had examined.—The spectroscopic analysis of the sun and other celestial bodies, in the hands of Kirchhoff, Huggins, Young, Secchi, Zöllner, Lockyer, and Respighi, has revealed many facts of importance. It has been shown that in the sun many of our familiar elements exist in the form of vapor. In the planetary atmospheres known vapors, and especially the vapor of water, have been detected. The stars have been proved to be

suns, many closely resembling our sun in elementary constitution, others formed very differently, but all incandescent orbs as he is, and surrounded by the glowing vapors of many elementary substances. The application of the analysis to nebulæ has led to the surprising discovery that while many of these objects shine with a light resembling that of our own sun, so that they may be considered to be formed by the aggregation together of many stars, others consist almost wholly of glowing gas, nitrogen and hydrogen forming their chief constituent elements. The observations of recent solar eclipses have been rewarded by many interesting discoveries respecting the physical constitution of the sun, the colored prominences surrounding him, and the corona which lies beyond the prominences. In these discoveries, Huggins, Young, Janssen, Lockyer, Respighi, and Secchi have borne the principal part. The progress of practical astronomy, and particularly the application of the telescope to the determination of the exact position of the celestial bodies, has proceeded *pari passu* with the progress of mathematical analysis and direct telescopic observation. The invention of the equatorial, the transit instrument, the mural circle, and other instruments of exact observation, belongs to the comparatively early history of modern astronomy. In the present day these instruments are constructed with a degree of perfection, and with a multiplicity of contrivances for improving their performance or extending their application, which are truly surprising. Nor have the achievements of instrumental astronomy fallen short of the promise afforded by the qualities of the instruments. It would be sufficient to point out that the telescope has revealed the greater number of those minute inequalities of planetary motion which have afforded the material for the analytical researches above referred to; but we may add that we owe to the telescope the recognition of the aberration of light, the discovery of the proper motions of the stars, the determination of the sun's distance, and the partial solution of the most difficult problem yet attacked by astronomers, the determination of the distances of the stars. Lastly, the spectroscope promises to play an important part in instrumental researches, since already it has been applied to the determination of the velocity with which stars are approaching us or receding from us, and to the measurement of movements taking place within the solar atmospheric envelopes.—For a popular view of astronomy, Sir John Herschel's "Outlines" may be recommended; and full details respecting practical astronomy will be found in the treatise on that subject by Prof. Loomis of New York, justly described by Prof. Nichol as "the best work of the kind in the English language." A thorough knowledge of physical astronomy would require an acquaintance with such works as Laplace's *Mécanique céleste*, translated by Bowditch, Gauss's *Theoria Motus Corporum Cœlestium*, translated by Admiral C. H. Davis, U. S. N. (Boston, 1858), Delambre's *Astronomie*, or Peirce's "Analytical Mechanics" and "Celestial Mechanics." For the history of astronomy, see Whewell's "History of the Inductive Sciences," Grant's "History of Physical Astronomy," Jahn's *Geschichte der Astronomie*, and Delambre's *Histoire de l'astronomie*. For full information concerning the modern history of astronomy, Zach's *Monatliche Correspondenz*, Lindenau's *Zeitschrift*, Schumacher's *Astronomische Nachrichten*, continued by Dr. Peterson, and Gould's "Astronomical Journal" (Boston) must be consulted; also, the French *Connaissances des temps*, which contain Leverrier's discussions that led to the discovery of Neptune, the Berlin *Jahrbuch*, the Milan *Effemeridi*, and the American "Ephemeris and Nautical Almanac."

ASTRUC, Jean, a French physician, born at Sauve, March 19, 1684, died May 5, 1766. He was a graduate and became a professor of the medical college of Montpellier as a substitute of Chirac, on whose death he succeeded him in the professorship, after having filled for some time the chair of anatomy in Toulouse. In 1730 he became regent and professor of the faculty of medicine at Paris, and was also physician to the king. His most celebrated work is *De Morbis Venereis Libri sex* (2d ed., 2 vols., 1740; translated into French and other languages); and he was regarded as a high authority on venereal and female diseases and obstetrics, though he excelled rather by his prodigious memory than by inventive genius. Among his many other writings are *Traité des maladies des femmes* (6 vols., 1761–'5), and a posthumous work, *L'art d'accoucher réduit à ses principes* (1 vol., 1768).

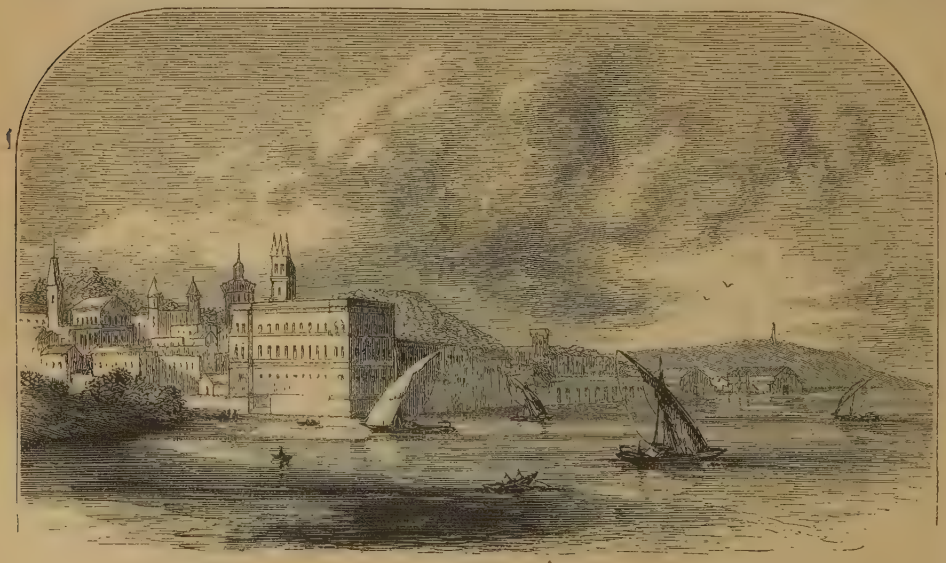
ASTURIAS, a former province of N. W. Spain, bordering on the bay of Biscay, bearing the title of principality, and still commonly known by its ancient name, although since 1833 it constitutes the province of Oviedo; area, 4,088 sq. m.; pop. in 1867, 588,031. The surface is irregular and hilly, the country being intersected by offshoots of the Cantabrian mountains, a chain varying in height from 6,000 to 10,000 feet. The scenery is picturesque and wild, and the coast is almost everywhere bold and high. The rivers are few and generally unimportant, the Nalon being the chief. The province is rich in coal, and in the north many mines are worked; the coal is shipped from Aviles and Gijon. Maize, wheat, potatoes, and fruits are the chief productions. The horses of Asturias are celebrated for strength and endurance. The inhabitants are of simple habits, retaining many old Spanish customs and peculiarities of dress that have elsewhere disappeared. They are proud of the freedom of their race from the admixture of Jewish and Arab blood found in the other provinces, and affect a superiority to other Spaniards. The herdsmen (*vaqueros*) among them form a separate and nomadic class, spending the winter on the coast and the sum-

mer in the mountains.—Asturias is famous in Spanish history as the refuge and stronghold to which the Christian Visigoths and their leaders fled when the Moors had gained possession of nearly all the rest of the peninsula, and had routed the Christian army in the battle of the Guadalete, in 711. The Christians held the province until, under the leadership of Pelayo, they gained a victory in 718, and, aided by the Frankish successes elsewhere, gradually drove back the Moors. Pelayo founded the kingdom of Asturias, over which he and his descendants ruled till 757, after which they were called kings of Oviedo. In 914 the court was transferred to Leon, that large district having been generally freed from Moorish rule and joined with Asturias. The title king of Leon was now borne by the reigning sovereign, and the history of Asturias became identical with that of the larger territory. The title of prince of Asturias was created for the Spanish heir apparent by John I. in 1388, at the wish of the duke of Lancaster, whose daughter the prince was about to marry; and the crown prince of Spain was thus designated until the expulsion of the Bourbon dynasty in 1868.

ASTYAGES, son of Cyaxares, the last king of Media and grandfather of Cyrus, by whom, according to Herodotus, he was dethroned after a reign of 35 years (594–559 B. C.). (See CYRUS.)

ASUAY, or **Azuay,** the largest of the three departments of Ecuador, occupying the whole eastern and southern portions of the country, between lat. 1° N. and 5° S., and lon. 68° and 80° W.; area, about 200,000 sq. m.; pop. about 250,000. In the western portion is an elevated desert, called the Paramo or desert of Asuay, being a plateau formed by the intersection of the Andes by two chains of mountains running E. and W. The eastern parts, however, are fertile, being well watered by the Napo, Putumayo, and other affluents of the Amazon; and the inhabitants here are engaged in agriculture and cattle breeding. On the edges of the western table land grow cinchona trees, whose bark forms one of the few exports of the country. The principal towns are Cuenca and Loja.

ASUNCION, Nuestra Señora de la Asuncion, or **Assumption,** the capital of the republic of Paraguay, on the E. bank of the river Paraguay, in lat. 25° 16′ S., lon. 57° 42′ W., 650 m. N. of Buenos Ayres; pop. in 1857, including suburbs, 48,000. It was founded in 1536 by Juan de Ayolas, and until 1620 was the capital of all the Spanish possessions on the Rio de la Plata. The streets are regularly laid out, but unpaved, and only a few of them have narrow flagged sidewalks. The dwellings are mostly of a single story, the better class built of adobes, with tiled roofs and projecting eaves. In building the ordinary houses, posts are driven into the ground to support the beams and rafters, then strips of bamboo are placed transversely, and the whole chinked and plastered with mud. The finest public building is the cathedral, rebuilt in 1842–'5. There are two other churches, in one of which the dictator Francia was buried, but one night his monument was destroyed, and his bones removed, no one knows whither. The *cabildo* or city hall, in which the congress meets, is a respectable structure; the government palace is a building of one story with a double front and portico. There is a stone quay bordering the river, upon which stand the arsenal and some workshops, mainly for ship building. The principal suburbs are La Recoleta and Lambaré, where are the cemeteries; but until recently the dead were buried in the churches. The climate is healthy, although in summer the thermometer frequently rises above 100°. In



Asuncion.

the neighborhood are many pleasant residences. Asuncion is connected by railway with Villa Rica, about 145 m. distant, and is favorably situated for commerce with the interior and upon the river. The population has, like that of all Paraguay, suffered much diminution in consequence of the war of 1865–'9 with Brazil, the Argentine Confederation, and Uruguay, shortly before the close of which the allied forces took possession of the city.

ASYLUM (Gr. ἄσυλον), formerly, a place of refuge, from which persons who fled to it could not be taken without sacrilege. The Jewish cities of refuge established by Moses and Joshua are the earliest examples of the custom of which we possess historical evidence. These were six in number, three on each side of the Jordan. There the involuntary homicide might escape the vengeance of the relatives of the deceased. In Greece, the temples, groves, altars, and sometimes the precincts of the temple, were asylums to men convicted or indicted for civil or criminal offences. Yet it was lawful to surround the temple, and let the fugitive die of hunger, and even in some cases to set fire to the building. In the later days of Rome, the eagles of the legions, and the statues and palaces of the emperors, were also asylums. The strongest religious sanction was thrown around these places of refuge. Insolvent debtors and runaway slaves resorted to them in great numbers. As law became more powerful under the Roman government, these asylums came to be regarded as nuisances; and at last an edict of the emperor Tiberius swept most of them away, both legal and pretended. With the barbarian incursions in the East and West, the necessity for asylums again arose. The new right of asylum fell to the churches. Under Constantine the Great, all Christian churches were asylums; the younger Theodosius extended the privilege to all courts, gardens, walks, and houses belonging to the church. The Franks in France and the Visigoths in Spain permitted it. Many of the popes favored this right. All convents, and even bishops' houses, became asylums. Opposed to the right were the temporal lords, whose jurisdiction was curtailed by the asylums. Several popes, in particular Gregory XIV. and Benedict XIII., restricted the right as narrowly as possible. All highway robbers, voluntary homicides, horse or sheep stealers, professional thieves, heretics under inquisition process, those who laid violent hands on nobles, forgers, false coiners, and duellists, were excluded from the privilege. In Germany, where the temporal power was strong, the right of asylum was never very effective. Sometimes, however, the German barons would themselves set up the right of asylum in their castles. The German emperors never regarded the ecclesiastical asylum, and it was entirely swept away by the Protestant princes. In England, in 1487, the right was for the first time restrained by a bull of Pope Innocent VIII. In 1534, after the reformation had commenced, persons accused of treason were debarred the right of sanctuary, which word is more commonly used in English law than asylum, and hence the phrase, "to take sanctuary," is equivalent to take refuge. In the time of Queen Elizabeth the right of asylum was denied to all criminals, but reserved to debtors. In 1697 the right of asylum was at length taken away from insolvent debtors. To Macduff, thane of Fife, who contributed to the overthrow of Macbeth, and to his descendants, was given by Malcom Kenmore, on the recovery of the throne of his ancestors, the privilege for any one of the clan Macduff who committed unpremeditated homicide, to have his punishment remitted for a fine, payable to the injured family, if he could get safe to Macduff's cross, which stood in Fifeshire. Many similar privileges were granted by charter in Scotland. To this day, Holyrood palace, as an ancient royal residence, continues to retain this right with respect to the persons of debtors. The boundaries of this place of refuge are liberal; the debtors find lodgings in a short street, the privileged part of which is divided from the unprivileged by a gutter running across it. This is the only existing sanctuary in the British empire. In the United States of America, no civil or ecclesiastical asylum ever existed. The right of asylum endured longest in Italy, and was first put an end to by the French occupation at the end of the last century. The houses of the clergy and graveyards became asylums in Italy in course of time; and the houses of the cardinals at Rome had this privilege, at least in theory, as long as the temporal power lasted.

ASYMPTOTE, a line (straight or curved) tangent to a curve, but having its point of contact with the curve at an infinite distance. If a weight were hung upon a cord, the ends of which were fastened to pins at unequal heights, the weight would slide to a point nearer the lower pin. Let now the cord gradually yield to the weight, and be stretched to an indefinite length, the weight, sliding constantly toward the middle of the cord, would move in a curve; and a vertical line midway between the pins would be an asymptote to that curve.

ATACAMA. I. A S. W. department of Bolivia, bounded by Peru, the Bolivian department of Potosi, the Argentine Confederation, Chili, and the Pacific ocean; area, about 70,000 sq. m.; pop. about 8,000. The greater portion of the department is a dry sandy desert entirely uninhabited, which is supposed to have been for ages the burial place of the aboriginal Peruvians. There are a few fertile valleys in the north. Anhydrous sulphate of soda is abundant in almost every part of the department, and large masses of solid iron have also been found in different localities. Gold, silver, copper, salt, and alum are also among the mineral productions. The capital is Cobija, or Puerto de la Mar, the only seaport which Bolivia possesses. **II.** The most northern province of

Chili, including the portion of the desert of Atacama lying S. of the preceding department, the separating line being the parallel of lat. 24° S., according to the treaty of 1866, and bounded E. by the Argentine Confederation, S. by the province of Coquimbo, and W. by the Pacific; area, about 38,000 sq. m.; pop. in 1868, 81,615. The province is divided into the departments of Caldera, Copiapo, Freirina, and Vallemar. It abounds in mineral wealth, including perhaps the richest silver and copper mines in the world. Of the former it has 247 and of the latter 994 which are now worked. The silver mines were discovered as lately as 1832, by a shepherd, Juan Godoy, and they have yielded since then ores to the value of over $100,000,000, fully one third of which amount has been derived from the mines of Chañarcillo. A village of over 1,500 inhabitants, which contains a free school, a church, a hospital, and a post office, now marks the spot of the discovery, and is named Juan Godoy. It is situated on the Chañarcillo hills, 51 m. S. E. of Copiapo, the capital of the department, with which city it is connected by railroad. Within a circuit of 25 leagues from Copiapo are 19 silver-mining districts, of which those of Chañarcillo, Tres Puntas, and Agua Amarga are the most important. The metal is found in a variety of combinations, of which sulphurets, chlorides, and chloro-bromides are the most important. A railway 101 m. long, the first ever built in South America (1850), connects the port of Caldera, one of the best on the whole coast of Chili, with Copiapo and with the mining districts further east.

ATAHUALLPA, or **Atabalipa,** inca of Peru at the time of the invasion of the Spaniards, died Aug. 29, 1533. He was the son of Huayna Capac. The laws of Peru required that the principal wives of the incas should be blood relations, and that no children of other parentage should be legitimate. Atahuallpa's mother had been a princess of Quito; nevertheless, at the request of his father, the heir to the throne, Huascar, consented to divide the kingdom with Atahuallpa, on condition only that he should render homage to him, and not make conquests beyond his own dominions. This liberal conduct was infamously requited by Atahuallpa, who, having secretly got together a large army, attacked Huascar in Cuzco, took him prisoner, loaded him with chains, and exterminated all his adherents, putting his family and immediate dependants to death in the most atrocious tortures. Such is the story told by Spanish annalists, whose testimony is doubtful, seeing that the murder of Huascar, their pseudo-ally, and the tyranny of Atahuallpa were among the causes of his own execution. Pizarro and his followers were now in Peru, and Atahuallpa opened negotiations with them. His proposals were received in a friendly manner by Pizarro, and an interview was arranged (1532), which Atahuallpa attended, followed by a very large number of unarmed subjects. Father Vicente de Valverde explained to him, through an interpreter, the mysteries of religion, and that on account of their heathenism the pope had granted his kingdom to the Spaniards. Atahuallpa professed not to understand the tenor of this discourse, and would not resign his kingdom; whereupon a massacre of the assembled crowd was at once commenced by the Spanish soldiers, who seized Atahuallpa and threw him into prison. On the arrival of Almagro the cupidity of the adventurers was excited by the magnificent proposals that Atahuallpa made for his ransom, and with a desire of seizing the whole it was determined to put him to death. During his imprisonment Atahuallpa gave orders for the execution of Huascar, which were obeyed. This was one of the charges against him on the court martial by which he was tried, and being found guilty, he was sentenced to be burned, a penalty commuted for strangulation by the garrote on his accepting baptism at the hands of the priests accompanying the invaders.—See Prescott's "Conquest of Peru," vol. i.

ATALANTA, a mythical personage, a native of Arcadia, or according to a less generally adopted legend, which gives her story with some variations, of Bœotia. She was the daughter of Jasus, who, having prayed to the gods for a son, was displeased at her birth, and as a mark of his displeasure exposed her on the Parthenian mount. Here she was nurtured by a she bear, and grew up to womanhood, retaining her virginity, and becoming the most swift-footed of mortals. She vanquished the Centaurs, who sought to capture her, participated in the Calydonian boar hunt, and engaged in the Pelian games. In course of time her father was reconciled to her; but when he urged her to choose a husband, she insisted that every suitor who aspired to win her should first contend with her in running. If he vanquished her, he was to receive her hand; if vanquished, he was to be put to death. Milanion overcame her by artifice: as he ran he dropped three golden apples, the gift of Venus, which Atalanta delayed to pick up.

ATASCOSA, a S. county of Texas, watered by the San Miguel river and Atascosa creek, branches of the Nueces; area, 1,262 sq. m.; pop. in 1870, 2,915. It is a stock-raising county, and about three fourths of the surface is prairie. The soil is sandy and easy of cultivation; and the climate is particularly healthy. In 1870 the county produced 36,371 bushels of corn, 11,839 of sweet potatoes, and 22,877 lbs. of wool. There were 97,622 cattle, 6,370 horses, 8,187 sheep, and 13,590 hogs. Capital, Pleasonton.

ATAUI, Hawaiian Islands. See Kauai.

ATAULPHUS, or **Ataulf** (Adolphus), king of the Visigoths, as successor to Alaric (410), to whom his sister was given in marriage, died in 415. He joined Alaric in Italy with an army of Goths and Huns, and aided him in the siege

of Rome. After the death of his brother-in-law, Ataulphus marched into Gaul, carrying with him captive Placidia, the sister of the emperor Honorius. The Gallic provinces of the empire were then in dispute between Jovinus and Honorius. Ataulphus offered to treat with Jovinus, but being repulsed made similar proposals to Honorius, and defeated and slew Jovinus. Honorius, however, would not be reconciled with the abductor of his sister, and Constantius, to whom Placidia had been espoused, harassed the Gothic kingdom, until in 414 the barbarians were compelled to withdraw, burning Bordeaux as they left, and crossing the Pyrenees into Spain. Ataulphus was assassinated by one of his equerries.

ATBARA, the principal eastern affluent of the Nile, rising in Abyssinia. (See NILE, and ABYSSINIA.)

ATCHAFALAYA, a river and bayou of Louisiana, connecting with the Mississippi near the mouth of the Red river, but receiving very little of its waters except in time of flood. Its course is nearly south to Lake Chetimaches or Grand lake, through which it passes, and from which, in a greatly enlarged stream, it discharges itself into Atchafalaya bay. Its name signifies lost river, and it is supposed by geographers to have formed the old bed of the Red river. The Teche and Courtableau are its principal tributaries. Its whole course is about 260 m.

ATCHISON. **I.** A county forming the N. W. extremity of Missouri, lying along the left bank of the Missouri river, bounded E. by the Nodaway and drained by the Tarkeo and Nishnabatona rivers; area, 675 sq. m.; pop. in 1870, 8,440, of whom 34 were colored. In 1870 the county produced 45,117 bushels of wheat, 1,312,030 of Indian corn, 69,666 of oats, 18,266 lbs. of wool, 127,826 of butter, and 6,110 gallons of wine. Capital, Rockford. **II.** A N. E. county of Kansas, separated from Missouri by the Missouri river; area, 424 sq. m.; pop. in 1870, 15,507. In 1870 the county produced 123,745 bushels of wheat, 619,447 of Indian corn, 96,012 of oats, 78,721 of potatoes, 23,239 tons of hay, 513,864 lbs. of butter, 207,839 of tobacco, and 201,593 of wool. Building stone is abundant. The central branch of the Union Pacific railroad passes through the county. Capital, Atchison.

ATCHISON, a city of Kansas, capital of Atchison co., situated on the W. bank of the Missouri river, at the extreme point of the "Great Western Bend," about 25 m. above Leavenworth; pop. in 1870, 7,054. It is an important railway centre, being the terminus of four roads: the Central Branch of the Union Pacific; the Missouri Pacific; the Kansas City, St. Joseph, and Council Bluffs, connecting it with the Hannibal and St. Joseph; and the Atchison and Nebraska. The city contains 5 churches, 9 schools, 3 banks, 2 newspaper offices, a large furniture manufactory, flour mills, and planing mills. The central school building, just completed at a cost of $45,000, is one of the finest in the state.

ATCHISON, David R., an American politician, born at Frogtown, Fayette county, Ky., Aug. 11, 1807. He was a lawyer in Clay county, Mo., when he was elected to the state legislature in 1834, and in 1841 was made judge of the circuit court for Platte county. From 1841 to 1855 he was a member of the United States senate, at first acting with the party opposed to the extension of slavery into the northern territories, but suddenly changing his policy in 1849. In 1854 he became prominent in the legislation for the organization of Kansas and Nebraska, advocating the repeal of the Missouri compromise. After the expiration of his term in the senate he became a proslavery leader in the conflict on and near the Kansas border in 1856–'7. Since that time Mr. Atchison has not appeared in public life.

ATE, a Greek deity, daughter of Eris or of Zeus. In the tragic poets she is the punisher of those who perpetrate crime; in the epic she is the instigator of gods and men to deeds which superinduce misfortunes. In this character she persuaded Jupiter to take an oath, which afterward enabled Juno to transfer to Eurystheus the power that had been intended for Hercules. When Jupiter perceived what he had done, he cast Ate from Olympus.

ATELLA, an ancient Oscan town of Campania, midway between Naples and Capua, the inhabitants of which were executed, sold as slaves, or expelled by the Romans in 211 B. C., for having been the first to declare for the Carthaginians after the battle of Cannæ. In the days of Cicero the town had recovered its prosperity, though it was classed by Strabo among the smaller towns of Campania. In early Christian times it became an episcopal see, and continued as such till the 9th century, but was then much dilapidated. In 1030 the inhabitants were removed to the neighboring town of Aversa, near which some remains still exist. Atella is celebrated in Roman literature through the *Atellanæ fabulæ*, also called *ludi Osci*, farces or comedies in the Oscan dialect. They were at one time highly popular in Rome. No entire play has come down to us.

ATH, or **Æth,** a city of Belgium, in the province of Hainault, on the river Dender, 30 m. W. S. W. of Brussels; pop. in 1866, 8,260. It has a tower built in 1150, a handsome town hall, a college, orphan asylum, &c. It has manufactures of linen, woollen, and cotton fabrics, of hats and gloves, bleaching and dyeing establishments, and breweries; and it is the seat of a considerable trade. It once had fortifications, but they were demolished in 1830.

ATHA BEN HAKEM, or **Alhakem ibn Atta,** surnamed Mokanna (the veiled), a Moslem impostor, born at Merv, Khorasan, killed about 780. He was by trade a fuller. He pretended to be the embodiment of the living spirit of God, and by his knowledge of philosophy and chemistry was enabled to perform wonders

which drew about him a large band of followers. He always wore a veil, declaring that no one could behold his face and live; but the real reason of his doing so is supposed to have been to hide the loss of an eye. The caliph Mahdi having sent an army against him, he shut himself up in the castle of Keh, north of the Oxus, and when no longer able to stand a siege put himself to death. According to some, he set fire to his castle and threw himself into the flames, followed by many of his disciples. Others state that he poisoned himself and his followers; and again others that he threw himself into a cauldron of corrosive acid, in the hope that his complete destruction would follow, causing the belief that he had been removed by divine agency. Mokanna is the hero of Moore's poem, "The Veiled Prophet of Khorassan."

ATHA MELIK, Ala ed-Din, a Persian historian and statesman, born in Khorasan about 1227, died at Bagdad in 1282. He enjoyed the favor of the Mongol princes of Persia, and was for many years governor of Bagdad. His history of the Mongols, entitled "Conquest of the World," has been highly valued.

ATHABASCA, or Athapescow. I. A lake of British North America, in lat. 59° N., and between lon. 106° and 112° W., about midway between the Rocky mountains and Hudson bay. It is about 20 m. wide from N. to S. and 230 m. long. Forts Chipewyan and Fond du Lac are on its N. shore. At the W. end it receives the Athabasca and Peace rivers, and discharges the Slave river, which flows N. into Great Slave lake, whence there is communication by the Mackenzie river with the Arctic ocean. The Black river issues from its E. extremity, and forms part of the channel through which, by Black, Manito or Wollaston, Deer, and Indian lakes, and the Churchill river, it is connected with Hudson bay. **II.** A river which rises in the Rocky mountains, near Mt. Brown, in lat. 52° 10′ N., lon. 116° 30′ W., and has a tortuous N. and N. E. course, receiving the overflow of the Lesser Slave and several other lakes, and entering Athabasca lake. Its length is about 600 m. A shoal several miles in extent is formed by the débris and drift timber which it brings into the lake.

ATHABASCAS, a family of American Indians, comprising two large divisions: one bordering on the Esquimaux in the northwest, and extending from Hudson bay to the Pacific; the other on the Mexican frontier, extending from the gulf of California to Texas, with smaller bands scattered along the Pacific from Cook's inlet to Umpqua river, Oregon. The northern district contains a variety of tribes, the more important being the Tinne (called Chipewyans by the Crees), the Tahkali or Carriers, Sicaunies, Kutchin or Loucheux, Dog Ribs, Mauvais Monde, Slaves, Beaver Indians, and Yellow Knives, with the Sursee on the Saskatchewan. Their numbers have not been accurately computed, but are estimated by Kirby at 32,000. The scattered tribes are the Kenaians or Tnaina on Cook's inlet, numbering about 25,000; the Kwalhioqua and Tlatskanai, about 100 each, on the Columbia; and the Umpquas, about 400 in number, on the river of that name. These tribes are all represented as timid, mild, and gentle in manner, peaceable and industrious. The southern district includes the sedentary Navajos, who cultivate the soil and weave blankets; the fierce, wandering Apaches, the most troublesome of tribes; and the more quiet Lipans of Texas. These number about 17,000. The name of the family is derived from Lake Athabasca, but the word is taken, not from their language, but from the Cree, meaning cords of hay according to some. They are easily distinguished from other families, having square massive heads, short hands and feet, and a quantity of beard quite unusual in American tribes. They profess to have come from a distant country in the west, over a series of islands amid ice and snow. Some writers trace strong Tartar resemblances in them, and Turner found curious analogies between their language and that of Thibet.

ATHALIAH, queen of Judah, daughter of Ahab, king of Israel. She was sought by Jehoshaphat, king of Judah, in marriage for his son Jehoram. This marriage was the occasion of the introduction of idolatry into Judah, and of an interruption in the Judean dynasty. After the death of Jehoram, and the short reign and destruction of her son Ahaziah (884 B. C.), Athaliah caused all the male members of the royal line, as she supposed, to be slain, and mounted the throne of Judah herself. But after she had reigned six years, the high priest Jehoiada produced her grandson, the young Joash, who had been saved from the massacre and reared in the temple, caused him to be anointed as king, and ordered the punishment of Athaliah by the armed Levites.

ATHAMAS, in Greek legendary history, a son of Æolus, married Nephele, who, discovering that he preferred Ino, the daughter of Cadmus, vanished from the earth. Ino endeavored to destroy Phrixus and Helle, his children by Nephele, but they were rescued by their mother and transported to Colchis on the back of the ram with the golden fleece. Juno, to punish the infidelity of Athamas, afflicted him with madness. While in this condition he killed Learchus, one of his sons by Ino, and the latter cast herself into the sea with her other son, Melicertes. Athamas now fled from Bœotia, and was commanded by an oracle to remain wherever he should be hospitably received by savage beasts. After much wandering he arrived at a place where wolves were devouring sheep; they fled at his approach, and left their prey at his disposal. Athamas settled there, and called his new territory Athamania.

ATHANASIAN CREED, a symbol chiefly composed of precise theological definitions of the doctrines of the Trinity and incarnation. The

first notices of it are from the 7th century, and do not mention the author. It made its appearance first in France, in the Latin language, became generally known throughout the West, and was adopted last of all in the East. The Greek writers immediately succeeding St. Athanasius make no mention of it. In the MS. editions of his works it is usually not found at all, or, if it is, with the remark, "commonly" or "incorrectly ascribed to St. Athanasius." Subsequently, however, it was ascribed to him by all ecclesiastical writers. Durandus (1287) states that it was composed by St. Athanasius at Treves during his exile in the West, and Mayer thinks this account not improbable. Modern critics generally suppose that it was drawn up as a summary of the doctrine of St. Athanasius, from which circumstance it obtained the name of Athanasian creed, and in process of time was attributed to the great Alexandrian doctor. It has been attributed, on conjectural grounds, to Hilary of Arles and Venantius Fortunatus, to Vincent of Lerins, and to Vigilius, bishop of Thapsus in Africa. This creed is an authoritative formulary of faith in the Roman and Greek churches. Its authority does not rest on the presumption that it was composed by St. Athanasius, but on its general acceptance as a correct enunciation of Catholic faith. In the Roman Catholic church it is recited at the office of prime on Sundays, when the office is dominical. In the church of England it is accepted as of equal authority with the Apostles' and Nicene creeds, and ordered to be recited on certain festivals at the morning prayer. In the 39 articles of the Protestant Episcopal church of the United States all mention of it is omitted, and the creed itself has no place in the prayer book.

ATHANASIUS, Saint, patriarch of Alexandria and doctor of the eastern church, died there in 373. He was born at Alexandria about 296, of Christian parents, was educated under the direction of Alexander, afterward bishop of the city, and spent some time in the desert as a disciple of the hermit St. Anthony. At the age of 23 he received deacon's orders, and in the discharge of his office so signalized himself as a foe to every kind of heresy, that he was chosen by Alexander to accompany him to the council of Nice (325). To the subtlety, learning, and eloquence of Athanasius in that council was principally attributed the condemnation of Arianism. His bearing on this occasion, not less than the dying request of Alexander, secured his election as bishop of Alexandria in 326. His uncompromising orthodoxy subjected him to bitter persecution from the adherents of Arius. The emperor Constantine summoned him before a synod at Tyre in 335 and declared him deposed. A synod at Jerusalem the next year confirmed this sentence and banished him to Treves. Constantius recalled him in 338. An Arian council at Antioch condemned him again in 341; but a larger orthodox council at Alexandria sustained him, and another at Sardis, with the Roman bishop at its head, replaced him in his episcopal chair in 349. Deposed for a third time, through the influence of Constantine, by the synods of Arles (353) and Milan (355), he was dragged from the altar by a band of soldiers, and fled into the desert with a price upon his head. Under Julian the Apostate he was again exiled, and spent some time in the wilderness of the Thebaid; and under Valens he suffered his fifth banishment, concealing himself four months in his father's tomb. He was finally restored to his see and died in peace. His festival is kept in both the Greek and Latin churches on May 2, and in the Greek church also on Jan. 18.—The life of Athanasius has historical importance mainly from its connection with the Arian controversy, and the establishment and defence of the Nicene creed. With the exception of his "Discourse against the Pagans" and his treatise on "The Incarnation," all his writings have a direct bearing upon Arianism. His style has the merits of strength, clearness, conciseness of expression, and exact logical order. It is praised even by Erasmus, the most fastidious of critics, above the style of Chrysostom and Gregory. What it lacks of finished grace it makes up in nervous vigor. Bold, unbending, confident even to dogmatism, severe against what he believed to be heresy, suspicious of the promises and professions of all who were not friends of the truth, he was yet courteous, kind to the poor, pious, just, and patient. The best edition of his works is that of Paris, 1627–'8, 3 vols. folio.

ATHELING. See ANGLO-SAXONS.

ATHELNEY, Isle of, a tract of about 100 acres in Somersetshire, England, 7 m. S. E. of Bridgewater. In the time of Alfred the Great it was an island at the junction of the Tone and Parret rivers. Alfred concealed himself among its marshes during the Danish invasion, and afterward founded an abbey there, about 888.

ATHELSTAN, the first who called himself king of the English, born about 895, died at Gloucester, Oct. 25, 941. He was a grandson of Alfred the Great, and illegitimate son of Edward the Elder; but as the only legitimate son of Edward who was of age died a few days after the death of his father, Athelstan was preferred by the witenagemote to his legitimate brothers, who were under age, and he was crowned king of the Anglo-Saxons at Kingston on the Thames in 925. He annexed the territory of Cornwall and Devon, and exacted tribute from Howel Dda, pendragon of Wales. When Sigtric, king of Northumbria, died, Athelstan seized upon his territory also. Aulaf, the son of Sigtric, obtained the assistance of the Danes and Norwegians, and was aided also by the Irish, Scots, and Welsh, who saw with dislike the increase of the power of the South Saxon king; but Athelstan signally defeated the allies at Brunenburg or Brunsbury in Northumbria. After this event Athelstan enjoyed great consideration on the continent of Europe. His sisters were given in marriage

to the king of France, the emperor of Germany, and a Norse king. He was succeeded by his brother Edmund. Athelstan added much to the code left by Alfred. One of his decrees was, that any merchant who made three voyages on his own account beyond the British channel, or narrow seas, should be entitled to the privileges of a thane. He favored learning, built monasteries, collected books, and encouraged the translation of the Scriptures into the vernacular. Two of his books are believed to be extant among the Cottonian manuscripts in the British museum.

ATHENA. See MINERVA.

ATHENÆUS, a Greek writer of the early part of the 3d century of the Christian era, born at Naucratis in Egypt. He is chiefly known as the author of the *Deipnosophistæ* ("Banquet of the Learned"), a voluminous work of imaginary table talk on almost every conceivable subject, especially gastronomy, between certain learned men while enjoying themselves at supper in the house of an imaginary Roman named Laurentius, with Galen the physician and Ulpian the jurist among the guests. It consisted of 15 books, but only the 1st and 2d, and parts of the 3d, 11th, and 15th, are now extant in an epitome, of which we know neither the date nor the compiler. Notwithstanding its many literary and artistic defects, the great mass of information which it contains, and the light which it throws on the manners of the ancients, will ever cause the *Deipnosophistæ* to be prized by the scholar and the antiquary. The best edition of this work is that of Dindorf (3 vols. 8vo, Leipsic, 1827).

ATHENAGORAS, a Greek philosopher of the 2d century, who became a convert to Christianity, and flourished probably in the reigns of Marcus Aurelius and his son Commodus. It is said that he was a native of Athens, and first master of the catechetical school at Alexandria. Intending to write against the Christians, he applied himself to the study of the Scriptures, became convinced of their truth, and addressed an apology to one of the emperors in behalf of the Christians. He also wrote a treatise in defence of the doctrine of the resurrection. These works of Athenagoras are still extant. Their style is Attic and elegant. The best edition is that of the Benedictines (Paris, 1742).

ATHENS (Gr. *Ἀθῆναι*), anciently the principal city of Attica, and now the capital of the kingdom of Greece, situated in lat. 37° 56′ N., lon. 23° 44′ E., about 4 m. from the E. coast of the Saronic gulf, and 4½ m. from the port town of Piræus. It was built round a central rocky height, called the Acropolis, an elevation about 300 ft. above the average level of the town, and 600 ft. above the Mediterranean. Grouped near it are several smaller elevations, with valleys between. N. W. of the Acropolis is a moderate height on which stands the temple of Theseus. At a short distance from the N. W. angle is the Areopagus; and over against the Areopagus is the hill of the Pnyx, with the hill of the Nymphs a little north, and the Museum, or hill of the Muses, at a short distance to the south. N. E. of the city rises the conical hill of Lycabettus. The plain itself in which the city stands is bounded N. by Mt. Parnes, which separates it from Bœotia; N. E. by Mt. Pentelicus; S. E. by Mt. Hymettus, which descends to the sea; S. W. and W. by the Saronic gulf; and N. W. by Mt. Ægaleos.

—A sketch of the history of Athens is necessary to the understanding of any description either of the ancient or modern city. No doubt a stronghold on the rock, afterward called the Acropolis, was the germ from which it grew. When or by whom this was founded is unknown. According to the legends, Cecrops, sometimes represented as an Egyptian settler, sometimes as an autochthonous Pelasgian hero, first took possession of the rock, which from him was called Cecropia. He was succeeded by a line of 16 kings, bearing the names of Cranaus, Amphictyon, Erechtheus I. or Erichthonius, Pandion I., Erechtheus II., Cecrops II., Pandion II., Ægeus, Theseus, Menestheus, Demophon, Oxyntes, Aphidas, Thymœtes, Melanthus, and Codrus. In the reign of the second or third king the city is said to have received its name from the goddess Athena (Minerva). Erechtheus is said to have built a temple to Athena on the Acropolis, where he placed the statue of the goddess, made of olive wood. The temple was called, from this legend, the Erechtheum. Theseus is said to have united the 12 communities, or cities, into which Attica was hitherto divided, into one political body. Menestheus led the 50 dark ships of the Athenians in the Trojan war, and is pronounced by Homer the first of warriors, except Nestor. The 17th and last king of Athens was Codrus, who sacrificed himself for his country in a war with the Peloponnesian invaders, who, according to an oracle, were to be victorious if they did not slay the king of the Athenians. After him no one, so the legend says, was permitted to bear the title of king. His son Medon succeeded him under the name of archon, or ruler, holding the office, however, upon the hereditary principle, and for life. A line of life archons continued to rule through 12 reigns, Alcmæon being the last. During the government of his predecessor, Æschylus, commenced the era of the Olympic games, celebrated at intervals of four years, at Olympia in Elis. This date—the earliest fixed point in Greek chronology—has been satisfactorily established at 776 B. C. After Alcmæon, a series of seven decennial archons carried on the government till 683, when the office was made annual, its various functions were distributed among nine colleagues, and the right of election was extended to the entire class of the *eupatridæ* or nobles. One of these, the head of the college, bore the title of "the archon," and was designated as the *eponymus*—a magistrate in whose name the transactions of the year were dated and

recorded. The office of archon lasted until long after the independent political existence of Athens and Greece had come to an end. The only important political body existing in Athens at the time of the first appointment of life archons was the senate or council of the Areopagus, which appears to have been in its earliest constitution the representative of the Homeric *boule*, and until the time of Solon was called simply the boule, or senate. In the course of time the oppressions and abuses of the eupatridæ gave rise to popular discontents, and Draco was appointed in 624 to draw up a code of written laws. He made no change in the political forms, but merely attempted to introduce a code the severity of which made it impossible to execute it. Twelve years after Draco's legislation Cylon, a member of the eupatrid order, attempted to usurp the supreme power of the state, but failed. Cylon escaped, and his partisans, who had taken refuge, some at the altar of Athena, others at the altar of the Eumenides, were put to death by the direction of Megacles, the representative of the house of the Alcmæonidæ. This act was supposed to have brought upon that race the curse of the gods, and they were expelled from the city in 597. Epimenides, the Cretan sage, was invited to purify the city from the pollution of sacrilege by expiatory rites. His visit is placed in 596.—The glory of Athens as a political commonwealth dates from the age of Solon, a lineal descendant of King Codrus, born about 638 B. C. At a time of great political disturbance, resulting in part from the oppressions of the eupatridæ, he was chosen archon in 594, and vested with unlimited power to make any changes that might seem necessary in the constitution of the state. He framed a new constitution, changing the title to political power from birth to property. He divided the citizens into four classes: 1. The *pentecosiomedimni*, or those whose annual revenue was equal to 500 medimni of corn and upward. 2. The *hippeis*, or knights, whose income ranged between 300 and 500 medimni, and who were sufficiently wealthy to furnish a war horse. 3. The *zeugitæ*, whose income ranged between 200 and 300 medimni, and who were able to keep a yoke of oxen. 4. The *thetes*, whose income fell short of 200 medimni. The 4th class were exempt from taxation and excluded from public office, but they served as light troops in the army. Only the first class were eligible to the higher offices of the state; the 2d and 3d classes filled the inferior offices; the 2d class served in the army as horsemen, and the 3d as heavy-armed foot soldiers. All classes had the right of voting in the public assembly, which elected the archons and other magistrates. He established another legislative body, called the senate or council of the four hundred, elected by the assembly, 100 being taken from each of the four ancient tribes, into which the people were divided long before Solon. The court of the Areopagus was endowed with enlarged powers, and with the general supervision of the conduct and lives of the citizens and the institutions of the state. Solon's kinsman Pisistratus made himself master of Athens in 560, adorned the city with many public works, collected a public library, and called around him the most distinguished poets, artists, and scholars from every part of Greece. He died in 527, and was succeeded by his two sons, Hippias and Hipparchus. By the conspiracy of Harmodius and Aristogiton, Hipparchus was slain in 514, and Hippias was compelled to quit Athens for Asia in 510. Clisthenes and Isagoras were now rivals for power, and the constitution of Solon went for a time into full operation; but Clisthenes soon reorganized the people of Attica by dividing them into ten tribes, instead of the old Ionic four tribes; and these ten tribes were local, and were subdivided into districts or townships called demes (*δῆμοι*). It was customary to designate every citizen by affixing to his name the epithet indicating the deme to which he belonged. The senate was also changed, and its powers and duties were greatly increased; it now consisted of 500 members, 50 being taken from each tribe. The general control exercised by the people over the affairs of government, through the *ecclesia*, was also greatly enlarged. The judicial powers of the people were regulated by the establishment of the heliastic courts, of which ten were organized, either by Clisthenes, or soon after his time. The new arrangement of the tribes led to a new arrangement of the military service, the administration of which was placed in the hands of ten generals, one being chosen from each tribe. With them was associated, however, the polemarch, or third archon, who under the old constitution held the exclusive military command. The ostracism was also introduced by Clisthenes.—The prosperity of Athens excited the jealousy of the Spartans, who soon made several attempts to overthrow the growing democracy. Their first plan was to establish Isagoras, the rival of Clisthenes, as tyrant of Athens; but the expedition set on foot for the purpose failed. They next planned the restoration of the exiled Hippias; and thus began that series of events which resulted in the Persian invasions of Greece, in repelling which the Athenians, under their generals Miltiades, Themistocles, and Aristides, took so conspicuous a part. The history of Athens in this struggle is completely identified with that of Greece until the battle of Platæa, in 479, when the Persians were finally vanquished. The conduct of the Athenians in meeting the invaders had given Athens the leadership of the country; and this was now acknowledged in the formation of the so-called confederacy of Delos, a union of numerous states under the Athenian hegemony. The rebuilding of Athens on a larger scale, and with stronger defences, excited the jealousy of the Æginetans and the Spartans, and attempts were made to interfere.

These were frustrated by the policy of Themistocles. The city was surrounded by massive walls, the fleet was increased, and the harbors of Piræus and Munychia were fortified with walls and towers, vast ruins of which remain to this day.—The progress of Athens in letters and arts in the time of her hegemony was wonderful; but her most brilliant period was that of Pericles, who came forward as a popular leader in 469. With slight interruptions, his administration lasted from 469 till his death in 429, though he held no permanent office. The names of Æschylus, Sophocles, Euripides, and Aristophanes in dramatic poetry, of Phidias and his school in plastic art, and of Anaxagoras and Socrates in philosophy, are connected with this period. The treasury of Delos was removed to Athens, and the amount of contributions increased beyond the assessment of Aristides. Public buildings of extraordinary splendor were erected. The great structures of the Periclean age were the Odeon, finished in 444; the Parthenon, 387; the Propylæa, 432; and the Erechtheum, which was not quite completed at the breaking out of the Peloponnesian war. This magnificent system of public works was under the general superintendence of the sculptor Phidias. The architects of the Parthenon were Ictinus and Callicrates. Mnesicles was the builder of the Propylæa.—The Peloponnesian war broke out in 431. The Lacedæmonian troops ravaged the plain of Athens, and the inhabitants of the country crowded into the city. In the next year a second invasion took place, and the plague carried off not less than a fourth of the inhabitants. The disasters in the field were accompanied by violent changes in the city. (See Greece.) After the defeat of the Athenians at Ægospotami and the surrender of the city in 404 to the Spartan general Lysander, the democracy, which had been restored, was again abolished, and a government of thirty established, under the control of Sparta, known in history as the thirty tyrants. The walls of Athens were demolished by the Lacedæmonians, and the arsenals and docks at Piræus destroyed. The Spartan rule was overthrown by a body of exiles, headed by Thrasybulus, who restored the reign of the ancient laws. But Athens never regained her leadership in Greece.—The period between 403 and 360 B. C., usually designated as that of the Spartan and Theban supremacy, is signalized by the adventures of Xenophon, the Athenian, in the expedition of Cyrus the Younger, and the retreat of the 10,000; the war of the Lacedæmonians, under Agesilaus, in Asia Minor; the Corinthian war; the peace negotiated by Antalcidas and bearing his name in history, 387; the partial reorganization of the Athenian confederacy on the basis of the confederacy of Delos; and by numerous distant expeditions, both by the Lacedæmonians and the Athenians. In 361 a general peace was concluded by consent of all parties except the Lacedæmonians; but in the following year the Athenians went to war with the Olynthians for the possession of Amphipolis, and this war brought them into collision with Macedonia under the lead of Philip, and after his death under that of his son Alexander. As the Macedonian successes increased, a party grew up in Athens which favored a conciliation of the conquerors. Until the death of Philip and the accession of Alexander, Demosthenes and the true Athenian patriots of his school were able to make a vigorous opposition to this movement; but when Alexander destroyed Thebes, and the Athenians could only protect themselves against him by almost complete submission, the Macedonian party triumphed, and in spite of the efforts of the great orator Athens sank into entire subjection to the invaders. A tranquil period, one of the most inglorious in the political history of the city, now ensued. When the news of Alexander's death arrived (323), a fresh attempt was made to overturn the Macedonian supremacy. Leosthenes, the Athenian, defeated the army of Antipater, the Macedonian general, at Lamia, a short distance N. of the pass of Thermopylæ; but the defeat of the Greek forces at Crannon in Thessaly once more placed the Macedonians in the ascendant. The Lamian war closed with the unconditional surrender of Athens to Antipater. From this time Athens became the victim of the contending chiefs of Macedonia. Demetrius Phalereus ruled the city ten years, supported by a Macedonian garrison; but in 307 Demetrius Poliorcetes was sent from Ephesus by his father, and compelled his namesake, the Phalerean, to surrender the city. The conqueror announced to the people the restoration of their ancient constitution, and was the object of extraordinary honors, though he did nothing to really elevate Athens, and his rule only added to her degradation. Athens continued under the Macedonian influence down to the conquest of Greece by the Romans, though nominally governed by her own laws, and preserving her ancient customs, rites, and ceremonies of every description. In 200 the last Philip of Macedon was involved in a war with Rome, and Athens, having taken sides with the Romans, suffered from his barbarism. The city was relieved by a Roman fleet; but before Philip withdrew from the siege he laid waste the gardens and suburbs, including the lyceum and the tombs of the Attic heroes, and destroyed the temples that stood on the Attic plain. Philip was defeated at the battle of Cynoscephalæ in 197, and in the following year Greece was declared free by the Roman consul Flamininus, at the Isthmian games. War was renewed by Perseus, and the Macedonian empire was finally overthrown by Lucius Æmilius Paulus in 168. In 147 war broke out between the Achæan league and Rome, but it was closed with the capture and sack of Corinth by the consul Mummius in the following year,

which saw the whole of Greece reduced to a Roman province, under the name of Achaia.—Under the Romans Athens was prosperous and respected. Her schools of eloquence and philosophy were open to the civilized world, and the sons of distinguished Roman citizens were sent there to complete their education. Her splendid temples remained uninjured; the magnificence of the city had been increased by the liberality of foreign potentates. Athens occasionally suffered during the civil wars. She took part with Mithridates, and was besieged and captured by Sulla, who destroyed the long walls and the fortifications, annihilated the commerce of Piræus, and left the city crippled in all her resources. The groves of the academy and the lyceum were cut down, and columns were carried off from the temple of Olympian Zeus to adorn some public building at Rome. The establishment of the empire made but little difference in the condition of Athens, and she continued the centre of the world of literature and art down to the commencement of the Christian era. St. Paul visited the city, and delivered his discourse on Mars Hill, probably about the middle of the 1st century. The emperor Hadrian, in the first part of the 2d century, finished the temple of Olympian Zeus, established a public library, and built a pantheon and gymnasium. Marcus Aurelius increased the number of the Athenian schools and the salaries of the teachers. About the middle of the 3d century the Goths, crossing the Hellespont and Ægean, descended upon Attica. Athens made a brave defence under the inspiration of the scholar and philosopher Dexippus, and suffered but little from the invasion before the enemy were driven back. In A. D. 258, a few years before the arrival of the Goths, the walls, which had been in a ruinous condition since the siege of Sylla, were repaired by Valerian. In 396 Alaric advanced upon Athens; but, not willing to undergo the delay of a siege, he accepted the hospitalities of the magistrates, and retired, leaving the city and Attica unharmed. For more than 100 years after this Athens enjoyed great prosperity as the chief seat of learning and culture; and we hear of her principally through the many learned men of the time who received their education in the city.—In the 5th century the beautiful Athenais, daughter of the Athenian philosopher Leontius, became a Christian, was baptized at Constantinople under the name of Eudocia, married the emperor Theodosius II., and did much by the influence of her example, and by building churches, to promote Christianity in Athens, the local government having recently authorized, by direction of an imperial rescript, the public recognition of Christianity there. The temple of Olympian Zeus was consecrated to Christ the Saviour; the Parthenon to the Holy Wisdom (St. Sophia), afterward changing the designation to the Panagia and the Mother of God; and the temple of Theseus to St. George of Cappadocia. After Justinian in the 6th century had broken up the schools, we scarcely hear of the city for nearly 400 years.—In the 12th century Athens was taken and plundered by Roger, king of Sicily. The fourth crusade again brought the name of Athens to the notice of Europe. Greece was parcelled out among the Frankish princes after the capture of Constantinople in 1204. Otho de la Roche was made duke of Athens in 1205, and four successors of his family held the dukedom till 1308. Walter de Brienne succeeded, and was overthrown by the Grand Catalan company, whose aid he had invoked. A duke of the Sicilian branch of the house of Aragon was invested with the dignity by the Catalans, and in this line the dukedom remained till near the end of the 14th century. Six dukes of the Florentine family of Acciajuoli followed, ruling Athens till 1456. The ducal court of Athens was one of the most brilliant in Europe. In 1456, when it was captured by Mohammed II., Athens appears to have been prosperous, and the number of its inhabitants is said to have exceeded 50,000. In 1467 the Venetians went to war with the Turks, and, invading Greece with a powerful fleet, landed at Piræus, and expelled the Turks from Athens after a bloody battle. Athens remained under the Venetians till 1470, when the sultan entered Greece with a large army and retook the city. He placed Athens under a waywode, who held his office from the chief eunuch of the harem. The external affairs of the city were managed by the waywode; a cadi, or judge, decided the controversies between the Ottomans, without interfering in those of the Christians. The garrison on the Acropolis was under the command of the Turkish disdar. The proper municipal affairs of the city were managed by magistrates elected from the principal families by the people, and called by the ancient name of archons. This form of administration remained unchanged from 1470 to 1687. In the latter year Morosini, the Venetian admiral, having gained brilliant victories in the war between the republic and Turkey, captured Athens, and obliged most of the Turks to leave the city. But an epidemic sickness and a fresh muster of the Turks compelled him to withdraw in March, 1688. A large number of the citizens fled, some to Salamis, Ægina, and other islands, some to Corinth, some to Nauplia, and others to Cephalonia. The city remained deserted till the following year, when the Turks entered it and committed a large part of the houses to the flames. The Athenians, however, began gradually to return. The sultan granted them a free pardon, and remitted the tribute for three years. From 1690 to 1754 the Athenians lived quietly, under a political organization essentially the same as that already described. Between 1754 and 1777 Athens was frequently harassed by Albanian incursions. In the latter year a battle was

fought at Calandria, near Athens, by the Athenian Turks and Greeks, under the waywode, named Chasekes, against these barbarians, commanded by the deli pasha, and a decisive victory gained. In 1778 Chasekes fortified Athens with a wall, using materials taken from many of the ancient structures. The conduct of Chasekes gained him so much popularity, that his reappointment was solicited and obtained of the Porte, and finally he was appointed waywode for life. Having secured his end, he threw off the mask, and showed himself to be a tyrant. The tide of popular feeling turned against him, and he was banished; but by intrigue and bribery he was again restored. The contest continued 22 years, during which the game was repeated five times; and finally, in 1795, he was beheaded in Cos, the place of his exile. In this period the prosperity of Athens declined. Her population and wealth greatly diminished. A pestilence ravaged the city in 1789 and again in 1792; about 1,200 perished in the former, and 1,000 in the latter. In the movement toward a revival of Greek independence, which distinguished the close of the last century and the beginning of the present, Athens played a prominent part. New schools were established, and the whole influence of all her educational institutions was on the side of Greek freedom. The actual war of independence commenced in 1821. The fortunes of Athens were variously affected during the seven years of its continuance. The Turkish garrison was besieged in the Acropolis April 28, but after many tragical scenes was relieved July 20, and the Greek troops were compelled to retreat by the Turks under Omer Pasha, Briones, and Omer Bey. Many of the inhabitants were slain, and the city was plundered and burned. Many of the Athenians fled to Salamis and Ægina, and some of them joined the troops concentrating at the isthmus of Corinth. In September, 1821, Omer Pasha retired from Athens with the greater part of his forces, and his lieutenant soon afterward with the remainder. The Acropolis was again left in the hands of the resident Turks, and the Athenians, returning from their places of refuge, besieged them, and compelled them to surrender, June 21, 1822, 1,160 prisoners being taken. Before these could be conveyed to a place of safety, a rumor of a new invasion spread through the city, and caused the Athenians such alarm that they fell upon the Turks and put to death about 400, in violation of the terms of the surrender. During the next two years violent dissensions between the Greek leaders delayed the progress of the war; but in spite of the treachery of Odysseus, a leading general, who joined the enemy and made hostile movements against Athens, the body of the troops and citizens faithfully supported Guras, the commander of the city, and finally gained a decisive victory, capturing Odysseus, who was put to death. Early in 1826 the Turkish forces, under Kiutahi Pasha and Omer Pasha, overran Attica. Numerous conflicts occurred in the neighborhood of Athens. On Aug. 15 the Turks forced their way into the city, and the Greeks retired into the Acropolis, where they were long besieged, suffering great hardships. Guras was killed in an outwork. During the siege the Greek forces outside the city, under the command of the English Lord Cochrane, Gen. Church, and others, strove to relieve the garrison. In May a bloody and decisive battle was fought, and the Greeks were entirely defeated. Cochrane and Church were compelled to seek refuge on board their ships, and the posts in the neighborhood of Piræus were abandoned. The citadel was compelled to surrender June 5. More than 2,000 men and 500 women were marched down from the Acropolis, and transported to Salamis, Ægina, and Poros. Thus, after a siege of 11 months, Athens was again placed under Turkish domination. The city remained in the possession of the Turks till 1832, when the intervention of the great powers had secured independence to the Greeks under a republican form of government, with President Capo d'Istria at its head. During these last years almost all the modern buildings of the city had been demolished. Scarcely a private dwelling was uninjured, and the remains of antiquity shared in the general calamity. The city recovered slowly, and had little prosperity until subsequent events drew back to it some part of its former population. Capo d'Istria was assassinated in 1831. In August, 1832, Otho, the second son of the king of Bavaria, who had been selected by the great powers, England, France, and Russia, was proclaimed king at Nauplia. He arrived at the end of January, 1833. The king, only 17 years old when he was chosen, attained his majority, which was fixed at 20, in 1835. In that year the seat of government was transferred from Nauplia to Athens, and from this date recommences the history of Athens as a new centre of civilization in that quarter of the world. Its prosperity now quickly revived. A new liberal constitution, drawn up by an assembly convened at the demand of the people, and formally accepted March 16, 1844, made great changes in the government of Greece, of which the city speedily felt the favorable results. Since 1844 there have been few events of importance in the history of Athens. In 1854, during the Crimean war, revolutionary movements having broken out against the Turks, Athens was occupied by a garrison of French and English troops, which was not wholly withdrawn till 1857. In 1854 also the Asiatic cholera visited the city, causing terrible suffering and a very great number of deaths.—Our knowledge of the appearance and topography of ancient Athens is derived from several sources: from the ruins now visible in the modern city, from which almost alone scholars have been able to ascertain the positions of many walls and buildings; from

the casual references and allusions of ancient historians, orators, and dramatists; but most of all from the detailed account of Pausanias, who visited Athens in the time of the Antonines, a period of great splendor. By the aid of these means of information, interpreted and arranged by many eminent scholars—among whom Col. Leake and the German philologist Forchhammer are prominent as having established the principal points almost beyond a doubt—a very accurate idea has been formed of the ancient capital, its fortifications and environs. In describing it, we shall, after a few necessary explanations, follow the route taken by Pausanias, using his descriptions in their order, and filling the gaps left by him with information derivable from other sources.—Athens—that is, all the district lying within the fortifications—consisted of three parts: 1. The Acropolis, often called simply the Polis. 2. The Asty, or upper town, as distinguished from the port towns, and therefore really in-

Plan of Athens and the Port Towns.

cluding the Acropolis. 3. The port towns, Piræus, Munychia, and Phalerum. The Acropolis was in itself a citadel; the Asty was surrounded by walls; and three similar walls, the two long walls and the Phaleric wall, connected the Asty with the port towns. About the position of these last three there has been little doubt; but the questions concerning the walls of the Asty itself have been matter for controversy. For a long time the views of Col. Leake on this point were considered the true ones; but Forchhammer's theory is now generally adopted as correct. The wall around the Asty measured 60 stadia; that around Piræus (with Munychia) the same; the length of each of the long walls was 40 stadia, and that of the Phaleric wall 35. The walls of Piræus, and probably the others also, were 60 feet in height. Between the long walls, which were 550 feet apart, ran a carriage road from the Asty to Piræus; and this was probably lined with houses, so that the city was continued through the whole distance. Although some kind of fortifications probably surrounded the Asty from the earliest times, the great wall around it, to which we have alluded, was built by Themistocles as soon as possible after the battle of Salamis. The port towns, though also slightly fortified by him, were first regularly walled and laid out under Pericles, by whose advice they were connected with the Asty by the northern long wall and the Phaleric wall. The southern long wall was not built until about the beginning of the Peloponnesian war; the Phaleric wall then became comparatively useless, and was allowed to decay. The position of the gates in the wall of the Asty has been a matter of much doubt. The locations given in the accompanying map are those agreed upon by the best authorities, though many of them are still uncertain.—Pausanias apparently entered the city by the Piraic gate, and his first mention is of the Pompeium, a building used as a depository of certain very valuable sacred vessels (*πομπεῖα*) when not in use. Here were several statues, among them one of Socrates. Beyond this, in passing toward the Acropolis, were the temples of Demeter (Ceres), Hercules, and several minor deities; then the gymnasium of Hermes (Mercury); all these were on the road leading toward Piræus, and passing between the hills of the Museum and the Pnyx. The former of these, lying on the historian's right, and S. W. of the Acropolis, was a considerable elevation, crowned by a fortress, and probably covered with houses. Upon it was the monument of Philopappus, which still remains in a ruined state. The hill of the Pnyx, the height lying to the left of Pausanias, was one of the famous localities of Athens. Here was the *bema*, or pulpit of stone, from which the great Athenian orators spoke to the assembled people, gathered in a semicircular level area of large extent, which was the Pnyx proper (*Πνύξ*). The bema and traces of the levelled area still remain. Beyond the Pnyx, to the northeast, was the Areopagus, or hill of Ares (Mars), on the S. E. summit of which the famous court or council of the Areopagus held its sittings. N. W. of the Pnyx was still another hill, that of the Nymphs. Along the road taken by Pausanias colonnades extended, probably forming the entrances to dwellings in the rear. Pausanias next entered the district of the Asty called the inner Ceramicus (the outer Ceramicus lying outside the walls), at that prominent point of Athens, the Agora, or market place. This was a square surrounded by colonnades, temples, and public buildings, decorated with statues and paintings. On the right, as Pausanias entered it, stood the Stoa Basileius (royal colonnade), in which was held the court of the archon basileus. Upon its roof and near it were numerous statues, which Pausanias describes. Next this stoa was another, the Stoa Eleutherius, decorated with paintings by Euphranor. Near this, again, stood the temple of Apollo Patrous, that of the Mother of the Gods, and the council house of the 500. According to the account of the

1. *Erechtheum.* 2. *Propylæa.* 3. *Temple of Nike Apteros.* 4. *Temple of Ares.* 5. *Sanctuary of Semnæ.* 6. *Odeon of Herodes.* 7. *Theatre of Dionysus.* 8. *Stoa Eumenea.* 9. *Monument of Lysicrates.*

Plan of Ancient Athens.

historian, the Tholus, a circular stone edifice dedicated to the gods, the temple of Aphrodite Pandemus, the altar of the Twelve Gods, and a very great number of statues of gods and heroes, also stood around the market place: and on the fourth side were the Stoa Pœcile, the temples of Aphrodite Urania and Hephæstus, and the Eurysaceum, a temple to the memory of Eurysaces, a son of Ajax. In the Agora was also an enclosure where the votes for ostracism were received. Many of these things are not mentioned until later in the historian's account, for Pausanias now changed his route, passed down the road continuing the street of the Ceramicus on the other side of the Agora and leading to the Ilissus, and only returned to the Agora after describing much of the remainder of the city. Near the end of the long street, which was generally lined with private houses, he found the Odeon, first built for a public theatre, but afterward used as a granary, and near it the Enneacrunus, or fountain of Callirhoë, the only supply of fresh running water in ancient Athens, the rest used by the inhabitants having been drawn from wells. Beyond these were several smaller temples. Returning to the Agora, and describing those parts of it not alluded to before, Pausanias now began a new excursion, passing up the Ceramicus toward the gate, noticing the gymnasium of Ptolemy

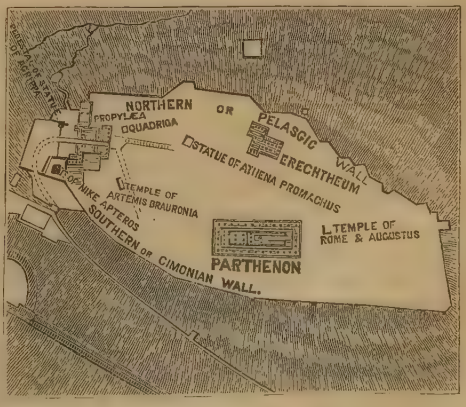
Present Appearance of the Theseum.

and the temple of Theseus, or Theseum. This edifice, at this day the best preserved monument of the splendor of ancient Athens, was

a structure of Pentelic marble, a peripteral hexastyle of the Doric order of architecture, 104 ft. long, 45 broad, and 33½ high to the summit of the pediment. Its sides and pediments were adorned with sculptures, some of which remain, though much injured. Many of these, as well as parts of the building, were painted. They set forth incidents in the lives of Theseus and Hercules. Pausanias turns to the right at the Theseum, and visits the temple of the Dioscuri (Castor and Pollux), the Aglaurium or sacred enclosure dedicated to Aglaurus, and the Prytaneum, an edifice in which were deposited the laws of Solon. The Olympieum, S. E. of the Acropolis, was the largest and must have been in some respects the most magnificent of all the Athenian temples. It was begun by Pisistratus and finished by the emperor Hadrian, so that its construction was continued at intervals through a period of 700 years. It was 350 ft. long, 171 broad, and of great height, surrounded by a peristyle comprising 160 columns, 16 of which remain standing; they are 6 ft. 6 in. in diameter, and more than 60 ft. high. Several minor buildings are next noticed by Pausanias, among them the Pythium and the Delphinium, both temples of Apollo. After visiting certain gardens which appear to have been in this quarter of the city, he describes the Cynosarges and the Lyceum, both outside the walls; the former a place sacred to Hercules, the latter the famous gymnasium in which Aristotle expounded his doctrines. Pausanias returned

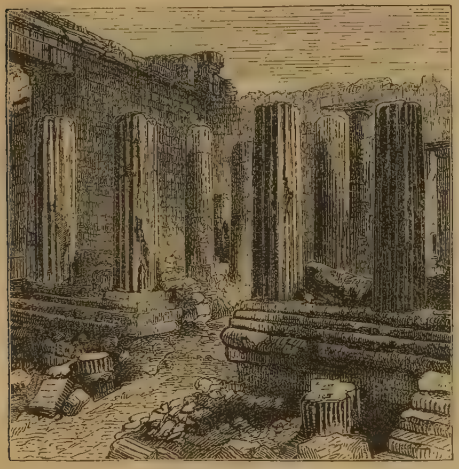
General View of the Acropolis at the Present Day. (From a recent Photograph.)

along the Ilissus, passing several lesser altars and sanctuaries, and his account makes its next important subject the Panathenaic Stadium, a partly natural amphitheatre in the hills, in ancient times furnished with marble seats from which an immense multitude could witness the games below. The terraces of this amphitheatre are still to be traced. The historian returns to the Prytaneum, notices the Choragic Monument of Lysicrates, which still exists, among the most beautiful of the smaller relics of Athenian art, and enters the sacred enclosure of Dionysus, in which stood two temples, and near which was the Dionysiac theatre. Near the theatre, again, stood the Odeon of Pericles, the roof of which is said to have been formed in imitation of the tent of Xerxes. Passing westward along the base of the Acropolis, Pausanias mentions the tomb of Talos, the temple of Æsculapius (Asclepieum), and several other monumental tombs and temples, which were here clustered together.—In following his description of the Acropolis we are aided by the magnificent ruins still remaining



Ground Plan of the Acropolis.

of the temples that covered its summit, and may safely supply many details of the account. The principal buildings on the summit of the Acropolis were the Propylæa, the Erechtheum, and the Parthenon. The Propylæa served at once as an architectural embellishment and a military defence. Among the ancients it was more admired than even the Parthenon, for the skill with which the difficulties of the ground were overcome, and for the grandeur of the general effect. The approach was a flight of 60 marble steps, and was 70 ft. broad. At the top of the steps was a portico of six fluted Doric columns, 5 ft. in diameter and 29 ft. high. The side wings, on platforms, 78 ft. apart, had three Doric colums *in antis* fronting upon the grand staircase. The north wing contained the Pinacotheca, a hall 35 ft. by 30; the hall of the south wing was 27 ft. by 16. Behind the Doric hexastyle was a magnificent hall 60 ft. broad, 44 deep, and 39 high, with



Ruins of the Propylæa.

a marble ceiling resting on enormous beams, supported by three Ionic columns, on each side of the passage. At the east end of this hall was the wall, through which there were five entrances, with doors or gates. The central opening, through which the Panathenaic procession passed, was 13 ft. wide and 24 ft. high; those next the central are, on each side, 9½ ft. wide, and the smallest 5 ft., the height varying in proportion. These gates were the only public entrance into the Acropolis. Within the wall, on the eastern side, was another hall, 19 ft. deep, its floor elevated about 4½ ft. above the western, and terminated by another Doric portico of six columns. The pediments and ceilings of this structure have been destroyed. Most of the columns remain, some of them entire, with heavy fragments of the architraves. Passing through the Propylæa, one came to the Erechtheum, on the left or north side of the Acropolis, and the Parthenon on the right, near the southern or Cimonian wall. The form of the Erechtheum was oblong, with a portico of six Ionic columns at the east end, and a kind of transept at the west, a portico of four columns on the north, and the portico of the caryatides, standing on a basement 8 ft. high, on the south. At the western end

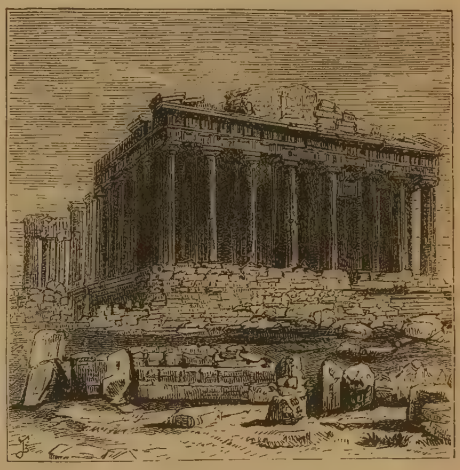
Portico of the Erechtheum, with Caryatides.

there is a basement, on which are four Ionic columns half engaged in the wall, and supporting a pediment. The eastern and western divisions of the temple are on different levels, the eastern being 98 ft. higher than the western. Enough remains of this extraordinary and beautiful temple to give a correct idea of its outward form; but the interior is in so

Ruins of the Erechtheum.

ruinous a condition that the distribution and arrangement of the divisions are subject to the greatest doubt. There remains to be described the Parthenon, the noblest monument in Athens. It was built of Pentelic marble, under the superintendence of Phidias,

by Ictinus and Callicrates. It stands on a basis approached by three steps, each 1 ft. 9 in. high, 2 ft. and about 4 in. wide. Its breadth, on the upper step, is 101·34 ft.; its length, 228 ft.; the height to the top of the pediment from the upper step of the stylobate, 59 ft., and with the stylobate, 64 ft. The temple is Doric, octostyle, or with eight columns at each end, and peripteral, or colonnaded all round, there being 15 columns on each side, not counting those at the corners—46 in all. The length of the *secos*, or body of the temple, is 193 ft., and its breadth 71 ft., omitting fractions. The space between the peristyle and the wall is 9 ft. wide at the sides and 11 ft. at the fronts. The body is divided by a transverse wall into two unequal portions: the eastern was the *naos* proper, an apartment for the statue of the goddess, 98 ft. in length; the western, the *opisthodomos*, which was commonly used as the treasury of the city, 43 ft. long. Within the peristyle, at each end, were eight columns, 33 ft. high, on a stylobate of two steps. Within the naos was a range of ten Doric columns on each side, and three at the west end, forming three sides of a quadrangle; above them, an architrave supported an upper range of columns, which Wheeler, at the time of whose visit they were still standing, calls a kind of gallery; 14 ft. distant from the western columns is the pavement of Piraic stone, on which the great chryselephantine statue of Athena was placed. Besides the internal decorations, the outside of the temple was ornamented with three classes of sculpture: 1. The sculptures of the pediments, being independent statues resting upon the deep cornice. The subject of those on the eastern pediment was the birth of Athena; of those on the western, the contest between Poseidon and Athena for the possession of Attica. 2. The groups in the metopes, 92 in number, representing combats of Hercules and Theseus, the Centaurs and Amazons, and perhaps some figures of the Persian war. These groups were executed in high relief. 3. The frieze round the upper border of the cella of the Parthenon contained a representation in low relief of the Panathenaic procession. All these classes of sculpture were in the highest style of the art, executed by Phidias himself, or under his immediate direction. Most of them were in place when Wheeler visited Athens, in 1676; and drawings of the figures in the pediments were made in 1674 by Carrey, a French architect in the suite of the marquis de Nointel, minister of France at the Porte. The interior of the temple was thrown down in 1687, by the explosion of a bomb in the Turkish powder magazine. The front columns of the peristyle escaped, but eight on the north side and six on the south were overthrown. Morosini, in endeavoring to remove some of the figures on the pediments, broke them, and otherwise did great mischief. At the beginning of the present century, Lord Elgin dismantled a considerable part of the Parthenon of the remaining sculptures, which form the most precious treasures of the British museum at the present moment. A question has been much discussed as to whether any portion of the exterior of the temple was decorated with painting. It is hardly possible to doubt the fact, after a personal examination. Many of the mouldings have traces of beautifully drawn patterns. Under the cornices there are delicate tints of blue and red, and of blue in the triglyphs. Architraves and broader surfaces were tinged with ochre. All these figures were executed so delicately and exquisitely, that it is impossible to accept the theory sometimes advanced of their being the work of subsequent barbarous ages. There are other traces of colors on the inner surface of the portion of the walls still standing, which evidently belong to a period after the stonecutters Eulogius and Apollos converted the Parthenon into a church. Among the inscriptions there is one, found in 1836, containing



Ruins of the Parthenon.

a record of money paid for polychromatic decorations. The Parthenon was built in the best period of architecture, and under the inspiration of the highest genius in art. Its aspect is simple, but scientific investigation has not yet exhausted its beauties and refinements. Unexpected delicacies of construction have not ceased to be discovered in it. In 1837 Pennethorne, an English traveller, noticed the inclination of the columns. Hofer, Schaubert, and others have examined the subject, and published their observations upon the inclination of the columns and the curved lines of the stylobate and architraves. Mr. Penrose, an English scholar and architect, visited Athens in 1845, and was afterward sent by the society of dilettanti to complete the investigations he had already commenced. The results were published in a splendid folio, in 1851. They may be briefly summed up thus: The lines which in ordinary architecture are straight, in the

Doric temple at Athens are delicate curves. The edges of the steps and the lines of the entablatures are convex curves, lying in vertical planes and nearly parallel, and the curves are conic sections, the middle of the stylobate rising several inches above the extremities. The external lines of the columns are curved also, forming a hyperbolic entasis. The axes of the columns incline inward, so that opposite pairs, if produced sufficiently far, would meet. The spaces of the intercolumniations and the size of the capitals vary slightly, according to their position. From the usual points of view these variations and curves are not perceptible, but they produce by their combination the effect of perfect harmony and regularity; and the absence of these refinements is the cause of the universal failure of buildings constructed in modern times according to what have been supposed to be the principles of Hellenic architecture. This subject is treated by Mr. Penrose in great detail, and with remarkable precision; also by M. Beulé, in *L'Acropole d'Athènes* (Paris, 1853–'5).—Besides these famous buildings, there were on the Acropolis others of less size, but great beauty. Such were the temple of Nike Apteros (the Wingless Victory), the remains of which have been discovered and restored, the temple of Rome and Augustus, and the temple of Artemis Brauronia. Among the celebrated statues and works of art on the summit of the Acropolis was the colossal statue of Athena Promachus, which represented the goddess holding a spear and in full armor. It was of such height that it could be seen at a considerable distance from the coast, above the Parthenon and the other highest buildings of the city.—The population of ancient Athens has been a subject of much controversy; but the results reached by different authorities differ by only a few thousands from the estimate of Leake, who supposes the city, including the port towns, to have contained about 192,000 inhabitants. Of these, all who corresponded to our laboring classes were slaves; a large proportion of the remainder were *metœci*, or residents of foreign birth; while the actual Athenian citizens, freemen in the enjoyment of all the civic rights, formed the smallest class of all. This statement uses the word citizen in a narrow sense, applying only to those within the walls; but the political privileges of an Athenian citizen were extended to all free-born and properly qualified citizens of Attica. They were generally divided into *eupatridæ*, or patricians, *geomori*, or landholders, and *demiurgi*, or tradespeople. (See Attica.)—The government of Athens in the time of its prosperity was in the hands of three bodies: the nine archons, elected annually; the *boule*, or council of state (of 400 members under Solon's constitution, 500 under Clisthenes, and after the year 306 B. C. increased to 600 members); and the assembly of the people (*ecclesia*). Among the archons were divided special departments of the executive power. (See Archon.) The boule debated important measures previous to bringing them before the assembly of the people, received reports, decided to what courts certain appeals should be made, &c. Its members held office for one year, and it held daily meetings. The ecclesiæ were of three kinds: assemblies of the people held on fixed days, at intervals of about a month; those called on extraordinary occasions by committees (as we should call them) of the boule; and those which in important cases included not only the citizens of the city but of all Attica. These assemblies had the ultimate power of decision in all cases without appeal, made war and concluded peace, passed laws and made alliances, and confirmed or censured the acts of officials. Their meetings, usually held in the Agora, on the Pnyx, or in the theatre of Dionysus, were conducted with many ceremonies. The chief court of the Athenians was that of the Areopagus, the origin of which is lost in prehistoric legends. Men who had held the rank of archon composed it. Its jurisdiction extended over all cases of treason and special cases of murder, serious assault, and arson. (See Areopagus.) Next stood the court of the *ephori*, who numbered 50, chosen from the citizens, who tried ordinary cases of murder and assault. There were several other courts of less importance. There were few taxes in ancient Athens. The state derived a great part of its income from the rent of its lands to private citizens. The taxes, including harbor dues, market taxes, taxes paid by foreign residents, the tax set upon public prostitutes (after the time of Pericles), and a few others, were farmed out. Upon the actual citizens there fell almost no burden of taxation. The fines imposed by the courts were also a considerable source of income for the state, and of course the largest sums of all were those extorted from enemies and foreign allies of the city.—The ceremonies connected with religious worship at Athens were perhaps more magnificent than in any other city of the ancient world. The chief among the great solemnities were the Panathenæa, the Dionysiac festival, and the Eleusinian mysteries. (See Bacchanalia, Eleusis, and Panathenæa.) The rites and temples were under the charge of priests, whose offices were generally hereditary. Immense sums were annually expended by the state in beautifying the temples, sacred enclosures, and monuments of the gods, and the days dedicated to them were celebrated with magnificent ceremonies.—The private life of the Athenians in the most ancient days of the city was simple; but with the administration of Pericles, or even before it, their customs became extravagant and sensual. The magnificent Athenian banquets of this and subsequent periods surpassed almost all others of the time. The guests reclined on couches about the tables, while dancers of both sexes, musicians, and the songs of hired slave girls accompanied the most extravagant feasts. These ended with sym-

posia, or drinking bouts, generally scenes of the wildest license. The education of the citizen before this period of luxury was as follows: After having his name inscribed by his father or other relative in the catalogue of his phratry (see ATTICA) when he was but three or four years old, the young Athenian was brought up during the next few years in the part of the house devoted to the women (*gynæceum*). At seven his actual education was begun under a pedagogue or tutor, under whose guidance he visited the schools and places of public athletic exercises, pursuing courses of rhetoric, mathematics, music, philosophy, and also of manly arts—riding, spear-throwing, wrestling, &c. Women and girls were scarcely allowed by decorum any social intercourse, nor were any facilities furnished them for education. This accounts for the fact that the most intelligent and brilliant women of Athens were found among the *hetæræ*, a term which is wrongly translated by our word prostitutes; for these women, though actually hired mistresses, were generally an orderly, highly educated class, and only obeyed customs which were sanctioned by the age. An Athenian could marry at or after the age of 14. Heiresses were compelled by law to marry their next of kin, outside the natural limits of course, that the property might not pass to another gens. Divorce was obtained by the simple consent of both parties; adultery was severely punished.

General View of Modern Athens. (From a recent Photograph.)

The Athenian private houses were generally small frame buildings, with tiled roofs: the streets between them were narrow and crooked. Only as late as the time of Clisthenes were fine private houses constructed, and the custom once begun, it increased so fast that Demosthenes severely reprimanded certain citizens for building houses far surpassing the public edifices; no ruins remain to give us an idea of these. The dress of the Athenians was very simple. The older men wore white robes or *himatia*, the younger the saffron-colored *chlamys* or tunic. The women wore the *chiton*, a long woollen robe; over it a cloak or wrapping, the *diploidon;* and outside this again a simple shoulder cloak or cape, the *hemidiploidon*. This dress varied little in times of festival.—In the present political division of the kingdom of Greece, Athens is the capital of the nomarchy of Attica and Bœotia, as well as of the entire kingdom. Its population in 1871, after a slow increase for several years, was 48,107. It is the residence of the king and court, and the seat of several important institutions of learning, art, and public charity. Among these are the university, employing more than 50 professors and instructors, and having a free library of more than 90,000 volumes; an observatory and botanical garden; two gymnasia on the German system; a military school, schools for the special education of priests and teachers, a polytechnic school, a seminary for girls, &c.

An "American female school" founded by Rev. J. H. Hill, is also maintained in the city; it was for a long time under the direct patronage of the government. The grammar and primary schools are excellent, and instruction is generally sought and widely diffused. Among the institutions of art is an association for the promotion of the study of the fine arts, and there are several museums in which the scattered relics of the old splendor of the city have been brought together and carefully arranged. Under the head of public charities fall an asylum for the blind and a hospital, both of considerable size. Among the public buildings are the palace, a fine building of three stories, near Mount Lycabettus, the chamber of deputies, the barracks, mint, theatre, and extensive structures intended for the assemblies of the national academy, and for the museum and polytechnic school. There are also about 100 churches, some of them admirable specimens of architecture. The largest is that of St. Nicodemus, built during the middle ages, in the Byzantine style. Like most of the others, it is not of great size, and depends for its effect on the beauty of its construction. The general appearance of the modern city is not especially attractive on near approach, though the magnificent height of the Acropolis, crowned with the ruins we have noticed above, and the pleasant situation of the town itself, give it a picturesque aspect when one views it from some distant point. Parts of the city have the dirt and squalor peculiar to nearly all towns of southeastern Europe; but its condition has been gradually improved since it became the royal residence, and now there are several broad streets and squares, well kept and clean. The hotels, shops, cafés, &c., are among the indications of the improvement of the city, and the local trade is active, though there is comparatively little commerce with foreign ports.—See Forchhammer's *Topographie von Athen* (in the *Kieler philologische Studien* for 1841, Kiel), and his essay in defence of his views in the *Zeitschrift für Alterthumswissenschaft* (1843, Nos. 69, 70); Leake's "Researches in Greece" (London, 1814), and especially his "Topography of Athens" (1821); also his work "On some Disputed Questions of Ancient Geography" (1857); Wordsworth's "Athens and Attica" (London, 1836); Stuart and Revett's "Antiquities of Athens" (London, 1825–'7); Mure's "Journal of a Tour in Greece" (Edinburgh, 1842); Kruse's *Hellas* (Leipsic, 1826); K. O. Müller's *Attika* (in Ersch and Gruber's *Encyklopädie*, English translation by Lockhart, London, 1842); Prokesch's *Denkwürdigkeiten* (Stuttgart, 1836); the article "Athenæ" in Smith's "Dictionary of Greek and Roman Geography" (London, 1854); Boeckh's "Public Economy of the Athenians" (translated by Lewis, London, 1842); Wessenberg's "Life in Athens in the Time of Pericles" (London, no date); Prof. Felton's "Greece, Ancient and Modern" (Boston, 1867); Tuckerman's "Greeks of To-day" (New York, 1873).

ATHENS, a S. E. county of Ohio, on the Ohio river; area, 430 sq. m.; pop. in 1870, 23,768. It has railroad communication with Marietta, Columbus, and Cincinnati. The surface is well wooded and extremely fertile, and abounds in iron ore and coal; and large quantities of salt are manufactured throughout the county. The Hocking river intersects the county, and the Hocking canal extends from its centre to the Ohio canal. In 1870 the county produced 133,745 bushels of wheat, 96,012 of oats, 619,447 of Indian corn, 78,721 of potatoes, 23,239 tons of hay, 207,839 lbs. of tobacco, 513,864 of butter, and 201,593 of wool. There were 57,399 sheep and 15,097 hogs. Capital, Athens, on Hocking river and the Marietta and Cincinnati and Hocking Valley railroads, 70 m. S. E. of Columbus.

ATHENS, a city, capital of Clarke county, Ga., on the Oconee river, at the end of the Athens branch of the Georgia railroad; pop. in 1860, 3,848, of whom 1,893 were colored; in 1870, 4,251, of whom 1,967 were colored. It is the centre of a large cotton-growing region, and has several cotton factories. The university of Georgia, a state institution founded in 1801, is situated here. In 1868 it had 5 instructors, 76 students, 256 alumni, and a library of 7,500 volumes. The law department had 4 professors and 14 students. The city has three weekly newspapers, besides two periodicals.

ATHERTON, Charles G., an American senator, born at Amherst, N. H., July 4, 1804, died Nov. 15, 1853. He was elected a member of congress in 1837, and on Dec. 11, 1838, introduced under a suspension of the rules a series of resolutions, declaring that "congress has no jurisdiction over the institution of slavery in the several states of the confederacy;" and that "every petition, memorial, resolution, proposition, or paper, touching or relating in any way or to any extent whatever to slavery, or to the abolition thereof, shall, on the presentation thereof, without any further action thereon, be laid on the table without being debated, printed, or referred." These resolutions were passed, under the previous question, by a vote of 126 to 78, and formed the basis of the 21st rule of the next congress, by which all such petitions, upon presentation, were considered as objected to, and the question of their reception laid on the table. Mr. Atherton continued in the house of representatives till 1843, when he was elected to the senate, where he remained till 1849. He was again elected in 1852.

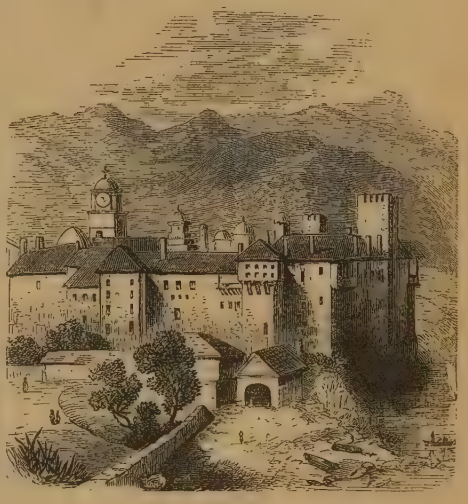
ATHIAS, Joseph, a learned Jewish printer in Amsterdam, died about 1700. He is principally noted for having published two editions of the Old Testament in Hebrew in 1661 and 1667, on which, on account of their correctness, most of the modern editions are founded. They are remarkable for being the first in which the verses were marked with Arabic

figures. In acknowledgment of his merits the states general conferred upon Athias a chain of gold and a medal.

ATHLONE, a market town and parliamentary borough of Ireland, on both sides of the river Shannon, near its entrance into Lough Ree, partly in Westmeath and partly in Roscommon, 68 m. W. of Dublin; pop. in 1871, 6,617. The opposite shores of the river are here united by a handsome bridge, and a canal has been formed to avoid the rapids at this point, thus making navigation practicable for 70 miles higher up the stream. The castle on the right bank of the river, with its outworks, covers 15 acres. It is connected by railway with Dublin and Galway, and an active trade is carried on by steamers with Limerick and Shannon harbor, and with Dublin by the Grand and Royal canals. After the battle of the Boyne William III. besieged Athlone unsuccessfully, but it was taken by Gen. Ginkell, June 30, 1691.

ATHOL, Athole, or **Atholl,** a district in the northern part of Perthshire, Scotland, embracing about 450 sq. m. It is picturesque and mountainous, some of the summits attaining an elevation of more than 3,000 feet. It contains several lakes and beautiful valleys, among which is the pass of Killiecrankie, where Graham of Claverhouse gained a victory and met his death in 1689. Agriculture is carried on in the valleys, while on the hills sheep and cattle are pastured.

ATHOS (mod. Gr. *Hagion Oros*, holy mountain; Turk. *Aineros*), the easternmost of the three peninsulas projecting from ancient Chalcidice, in the N. W. part of the Ægean sea, now included in the Turkish eyalet of Salonica, about 30 m. long and from 4 to 7 broad. It is mountainous, and cut by numerous ravines. At its extremity stands the mountain from which it takes its name. Mt. Athos is about 6,350 ft. high, with a peak of white limestone, while its lower rocks are of gneiss and argillaceous slate. The sides of the mountain are flanked with vast forests of pines, oaks, and chestnuts, the pines growing to an immense size. Various kinds of aromatic herbs grow here in abundance, out of which the monks extract the oils and essence and use them for medicinal purposes, perfumery, and ingredients in incense. It was across the isthmus which connects the peninsula of Athos with the mainland that Xerxes cut a canal for his ships, in his invasion of Greece. The remains of this canal, according to the best authorities, are still distinctly visible through most of its extent. Near the middle of its course it is not discernible, having been filled up. Athos was so called from the giant of that name who in the Grecian mythology hurled the mountain at the gods. The peninsula in ancient times contained several flourishing cities and a temple of Jupiter; and in the middle ages it was dotted over with hermitages and monasteries, 20 of which still remain. Most of these monasteries were founded by Byzantine princes. It was here that ambitious malcontents of the court of Constantinople, favorites in disgrace, and even private individuals, retired to await



Athos.

a change of affairs or return to favor. The monks at present number about 6,000, from Greece, Bulgaria, Roumania, and Russia, in all of which countries the convents of Athos possess estates. No female is permitted to enter the peninsula. The monks are ruled by an administrative assembly (*protaton*), composed of delegates from the various convents chosen for a term of four years. The administration of justice and the management of the revenue are also vested in this body. The assembly has its seat at Karias, the capital of the peninsula. A Turkish aga resides in Athos and collects an annual tribute from the convents. In the middle ages these convents were the seat of Greek science and the centre of Byzantine Christian knowledge, and possessed many large libraries. There are still to be found there old and beautiful manuscripts, several of which have been photographed and deposited in the museum of Moscow.

ATITLAN, or **Atitan,** a lake of Central America, about 20 m. in length and 8 to 10 m. in breadth, situated in the department of Solola, Guatemala. It appears, from the geological formations about it, to lie in the crater of an ancient volcano, and it is of extraordinary depth, no soundings, it is said, being obtainable with a line of 1,800 ft. Although several small streams flow into it, no outlet has been discovered. The scenery in its neighborhood is remarkably picturesque; high cliffs surround it, with but little vegetation. On the southern bank of the lake is a small Indian town of the same name, having barely 2,000 inhabitants.

ATKINSON, Thomas Witlam, an English artist and traveller, born in Yorkshire, March 6,

1799, died at Lower Walmer, Kent, Aug. 13, 1861. He excelled by his architectural designs and in landscape gardening, and wrote "Gothic Ornaments of English Cathedrals." He travelled extensively, and published "Oriental and Western Siberia, a Narrative of seven years' Explorations and Adventures in Siberia, Mongolia, the Kirghis Steppes, Chinese Tartary, and part of Central Asia" (London, 1857), and "Travels in the Regions of the Upper and Lower Amoor" (1860), both works illustrated from his own designs.

ATLANTA, a city, capital of Georgia, and also of Fulton county, and next to Savannah the largest and most important city in the state, 101 m. N. W. of Macon and 171 m. W. of Augusta; pop. in 1860, 9,554; in 1870, 21,789, of which 9,929 were colored. It is an important railway centre, the Atlanta and West Point, Atlanta and Richmond, Western and Atlantic, Georgia, and Macon and Western railroads connecting here. There is also a street railroad company. Atlanta lies nearly 1,100 ft. above the sea, and is built upon hilly ground. It is laid out in the form of a circle, about 3 m. in diameter, the union passenger depot occupying the centre. Oglethorpe park, at the terminus of Marietta street, about 2 m. from the depot, contains fine drives, lakes, &c. The chief public buildings are the state capitol, the city hall, the first Methodist church (South), the opera house, and the Kimball house, one of the largest hotels in the South. The principal manufactories are a rolling mill, three founderies, three planing mills, several flour mills, two railway shops, a brewery, and several tobacco factories. The business of the city amounts to about $35,000,000 annually. The valuation of property in 1872 was $13,545,585. There are two national banks, with a capital of $400,000, a loan and trust company, and two savings banks. The city is governed by a mayor and a board of 14 councilmen (two from each ward). The police force consists of 55 officers and privates. There are three steam fire engines, two hand engines, and a hook and ladder company. Atlanta contains a branch of the Baptist orphans' home and a ladies' relief society. Steps were taken in the autumn of 1869 to establish a public school system, and in 1872 three school houses had been erected, and 29 teachers were employed. Other institutions of learning are the North Georgia female college, Atlanta medical college, Oglethorpe college, Atlanta university (colored), two business colleges, an English and German select school, an orphans' free school, and a colored school. Oglethorpe college has a library of 5,000 volumes; the young men's library association possess about 3,000 volumes; and the state library contains 16,000 volumes. Three daily and two weekly newspapers and three monthly periodicals are published. There are 28 churches, viz.: 6 Baptist (1 colored), 1 Roman Catholic, 1 Christian, 1 Congregational, 2 Episcopal, 1 Jewish, 1 Lutheran, 13 Methodist (9 Southern and 3 colored), and 2 Presbyterian.—Atlanta was incorporated as a city in 1847. During the civil war it acquired great importance as the chief entrepot of trade between the western and Atlantic and gulf states, the principal manufacturing town in the south, and the seat of various government works of the confederacy. It was then strongly fortified. Gen. Sherman began an advance upon it from Chattanooga at the beginning of May, 1864, with 98,000 men and 254 guns. The defence was intrusted to Gen. Joseph E. Johnston, with about 50,000 men, occupying a position at Dalton. By a series of flank movements, and some severe fighting, particularly at Resaca, New Hope church, and Kenesaw and Lost mountains, Johnston, though skilfully manœuvring, was forced to retire from position to position, to the very defences of Atlanta, which he reached before the middle of July. On the 17th he was superseded by Gen. Hood, who assumed the offensive, making three heavy attacks on the federal forces (July 20, 22, and 28). These were repulsed with great loss, and Atlanta was besieged till Sept. 1, when Hood was compelled to evacuate it by a flank movement of Sherman's army which covered the lines of railroad in the rear of the confederates. Before abandoning the city, to fall back on Macon, Gen. Hood set fire to all the machinery, supplies, and munitions of war which he could not remove. The federal losses from Chattanooga to the occupation of Atlanta were 30,400 men and 15 cannon. The confederate losses amounted to about 42,000 men, 40 or 50 guns, and 25,000 stand of small arms. Both armies had been reënforced during the four months' contest. When Sherman moved his base of supplies to Chattanooga in November, the machine shops, depots, government buildings, &c., were set on fire. After the reconstruction of the state and the adoption of the constitution of 1868, Atlanta became the capital, since which time it has increased in population with remarkable rapidity.

ATLANTIC, a S. S. E. county of New Jersey; area, 620 sq. m.; pop. in 1870, 14,093. The Atlantic ocean borders it on the S. E., where it is indented by Great Egg harbor, Absecum and several other bays, studded with islands and planted with oysters. It is intersected by Great Egg Harbor river. The surface is low and flat; it is marshy near the coast, and the soil further inland is light and sandy. In 1870 the county produced 7,198 bushels of wheat, 47,488 of Indian corn, 31,702 of Irish and 18,514 of sweet potatoes, 4,675 tons of hay, and 5,020 gallons of wine. Capital, May's Landing.

ATLANTIC OCEAN, that branch of the general ocean which separates the continents of Europe and Africa from America. Its oldest name among the ancients was simply the Ocean (ὁ Ὠκεανός); it was afterward named the Atlantic ocean from Mount Atlas, which rises near its shores. It was known and navigated by the Phœnicians long before the be-

ginning of Greek historical records. Some of their colonies on its coasts are said to have been founded as early as 1100 B. C., and their commerce extended to the British islands and the Baltic. To the south they went equally far, and are believed to have even circumnavigated Africa six centuries before Christ, about the same time that the more timid Greeks recorded the passage of the first navigator of their nation through the strait of Gibraltar. But the real importance of this ocean as the great highway of modern civilization dates from the 14th and 15th centuries, when the outlying groups of islands, the Canaries, Madeira, and the Azores, were first visited, and finally Columbus, cutting loose from coasting voyages, struck across its unknown waste to the discovery of a new world. I. Geographical Description. The limits of the Atlantic ocean have been taken rather arbitrarily, generally between the Arctic circle and a line drawn from Cape Horn to the Cape of Good Hope. In physical geography it is a branch of the great southern ocean, forming a deep gulf of which the Arctic ocean is the blind end. Taken as a whole, the Atlantic has the shape of an irregular broad canal running north and south, with a deep bend to the west in the middle of its course. The projecting angles of the bordering continents are said by Humboldt to correspond to the reëntering ones on the opposite side. But in reality this correspondence is somewhat distorted, and thus narrows are formed by which the Atlantic is divided into three principal basins: the southern or Ethiopic, from the Antarctic ocean to the narrows between Cape San Roque and Senegambia; the middle or Atlantic proper, from the same narrows to the range of islands formed by the British and Faroe islands and Iceland; and the northern or Arctic. The Atlantic proper contrasts strongly with the Ethiopic by the great development of its shore line and the number of lateral arms or mediterranean seas in communication with it. Such are the Caribbean sea, the gulfs of Mexico and of St. Lawrence, Baffin and Hudson bays, the Baltic, the North sea or German ocean, the Irish sea, and the Mediterranean with its dependencies the Adriatic and the Black sea. In the Ethiopic ocean, on the contrary, the coasts are very uniform, with few indentations or bays, and no inland seas at all. The watershed of the continents bordering on the Atlantic basin is of remarkable extent, all the other oceans of the earth put together receiving but a fraction of the fresh-water drainage in comparison. Several rivers of Asia and one or two in northwestern America can alone bear a comparison with those of the Atlantic basin. The number of islands in the Atlantic ocean is small when compared with those of the Pacific. Leaving aside those islands which are merely detached parts of the continents, we can count scarcely more than a dozen groups. Like most of that class, they are principally of volcanic origin. Of coral islands, so numerous in the Pacific, there are but two groups, the Bermudas and the Bahamas. II. Depth, and Figure of the Bottom. The means employed for ascertaining the depth are generally modifications of the old-fashioned lead and line. In moderate depths this method suffices in its simplest form. In great depths, however, its indications are apt to be untrustworthy, because the shock of the lead on the bottom ceases to be felt, and the line continues to run by its own weight or is carried off by currents without sensibly slackening. Sounding with a small line or twine, to be abandoned together with the weight at each cast, was tried, but failed for want of means to determine when the bottom was reached. No sounding being now considered trustworthy unless a specimen of bottom is brought up as a proof that the lead has touched, it was found desirable to be relieved of the labor of hauling up the weight, and to bring up only the small apparatus and to collect the mud or sand. This was first accomplished by Lieut. Brooke's apparatus, a perforated cannon ball suspended in a sling which unhooks itself when the tension is relieved; an iron rod passing through the hole in the ball is provided with a contrivance to bring up a specimen, and is the only weight remaining on the line. Lieut. (now Admiral) Sands substituted two hemispheres for the solid shot, falling off on each side of the central rod, thus allowing a larger specimen cup to be employed. An original method proposed by Prof. Trowbridge consists in paying out the line (a small but strong twine) from a coil carried down with the weight, thus avoiding the friction of the line in passing through the water. The depth is registered by a screw similar to Massey's. Propositions for sounding without line have been numerous, the weight carrying down a float which is released on the bottom and returns to the surface; but none have been successful. In the United States coast survey deep-sea soundings are now usually made with a strong line and a heavy weight; detaching the latter is not considered of great importance, since the hauling up is done by steam. The depth is registered by Massey's indicator, based on the principle of a propeller screw, free to revolve in passing downward, and communicating its motion to a set of wheels registering the number of revolutions. It is clamped loosely to a spindle so as to be free from the torsion of the line, and is carefully tested and its error determined in moderate depths. The Atlantic ocean in its northern basin is better known with regard to depth than any of the others; nevertheless, there is need of more soundings before we can form a true idea of the figure of its bottom. Most of our knowledge of it has been acquired during the last 30 years. Before that, a few soundings, now mostly considered untrustworthy, and some theoretical speculations, were the sum of our knowledge. Dr. Young deduced, chiefly from the theory of tides, a depth of about 15,000 ft.

for the Atlantic, which is probably not far from the truth. Laplace supposed the mean depth of the ocean to be of the same order as the mean elevation of the land. But his supposed mean height of the land, 3,000 ft. (Humboldt estimated it more correctly at 1,000), was much too small to represent the mean depth of the ocean. Among the first connected series of deep-sea soundings were those made by the United States coast survey in connection with the exploration of the Gulf stream, those of Capt. Lee and Capt. Berryman in the brig Dolphin, of Sir Leopold McClintock in the Bulldog, and others. When the projects for laying submarine telegraph cables across the ocean began to assume importance, a sudden impetus was given to deep-sea sounding; complete sections across the ocean were explored in different directions, and the whole subject appeared much less formidable than before. After such feats as finding and grappling successfully a broken cable in mid-ocean and in nearly two thousand fathoms, the mere fact of sounding to obtain the depth appeared very simple. In late years a new scientific interest has arisen in the study of the deep-sea bottom by means of the dredge, and numerous soundings have been taken in connection with it in Europe and America. In studying a chart of the ocean containing many soundings it will be observed that on leaving the shore, in the greater number of cases, the depth does not increase regularly or according to a uniform slope, but that the bottom forms as it were a terrace around the continents, sloping very gradually down to a certain depth, from which there is a much more rapid descent into deep water. This depth we may assume at about 100 fathoms, and that line is generally marked on the maps; but it is really somewhat less, probably in the neighborhood of 80 fathoms. We may, for instance, find that we must sail 100 m. from the shore to find 100 fathoms depth; but in 10 m. more the lead would sink to 1,000. Hence, should the level of the ocean sink 100 fathoms, a large addition of territory would be made to the continents; 100 fathoms more would increase this addition by a mere narrow strip, very steep toward the sea. This terrace probably marks the ancient margin of the continents, and has been gradually formed by the encroachment of the ocean on the land. Hence it is as a rule wider on coasts formed of materials easily disintegrated than on those formed of hard rocks. The terrace is narrow on the coast of Spain and Portugal, and widens largely from the bay of Biscay northward, extending from 50 to 100 m. outside of the British islands, which it embraces together with the whole North sea. It is narrow along the coast of Norway, but extends from Spitzbergen half way to Cape North. On the coast of North America it is very wide, though interrupted at several points, from Newfoundland to Cape Cod, embracing all the banks. South of Cape Cod it is from 60 to 100 m. broad, narrowest at Cape Hatteras and tapering off toward Florida, but wide again on the W. side of this peninsula. The West Indies generally rise out of deep water. The terrace along the coast of South America varies generally from 60 to 100 m. in breadth, but becomes much wider S. of the Rio de la Plata, so as to include the Falklands. At the Cape of Good Hope it extends about 100 m. S. It has not yet been developed by observation along the W. coast of Africa. With regard to the depth of the trough of the South Atlantic ocean, we have little information. Some of the supposed deepest soundings on record, from 7,000 to 8,000 fathoms, were made off the coast of South America, but they are entirely discredited now. From a few trustworthy ones it is fair to suppose this basin to have what is probably the average depth of all oceans, viz., from 2,000 to 3,000 fathoms. (It may be stated in passing, that for the Pacific ocean the average depth between Japan and California, deduced from the velocity of earthquake waves, was found a little over 2,000 fathoms, between Chili and the Sandwich Islands 2,500, and between Chili and New Zealand only 1,500 fathoms.) Of the North Atlantic more is known than of any other ocean. The lines of soundings taken from England and France to Newfoundland, for the telegraph cables, show that no depth in that part exceeds 2,400 fathoms. From these and other soundings it appears that the bed of the North Atlantic consists of two valleys separated by a broad ridge running from the Azores to Iceland. The depth over the ridge is always less than 2,000 fathoms, generally about 1,500; it widens and shoals toward the north, forming there a wide plateau embracing both Iceland and the Faroe islands, with a depth of little more than 300 fathoms. The eastern valley varies between 2,000 and 2,500 fathoms, seems to extend to the equator, and shoals and tapers toward the north, turning at the same time toward the northeast, until it is reduced to the narrow channel between the Shetland and Faroe islands, with 600 fathoms. Beyond this point it cannot be followed for want of data. The western valley is not well known in its southern and middle part. It is probably very broad in the great bay formed between the West Indies, the United States, and Newfoundland, depths of over 3,000 fathoms being reported S. of the Bermudas. Very deep water, 4,580 fathoms, is said to have been found a short distance S. of the Grand Bank of Newfoundland, but this has not yet been corroborated by additional soundings. The valley then passes E. of the banks, gradually shoaling, and, after sending an offset into Davis strait, passes into the Arctic ocean through the narrow passage between Iceland and Greenland, having there a probable depth of a little more than 1,000 fathoms. Of the seas communicating with the Atlantic, the Mediterranean in its two basins reaches a depth of about 1,600

fathoms in the western and 2,200 in the eastern; and the Black sea a depth of 800 to 900 fathoms. The whole Mediterranean system is separated from the Atlantic by a barrier of 150 to 200 fathoms at the strait of Gibraltar. The Caribbean sea is deep, reaching to about 2,500 fathoms in some parts, and the passages between the Windward Islands are in some places more than 1,000 fathoms. The passage through the strait of Yucatan has about the same depth, and the gulf of Mexico may reach 2,000 fathoms in its central part. Its communications with the Atlantic through the strait of Florida and the Old Bahama channel do not exceed 400 or 500 fathoms.—From what we know at present of the Atlantic ocean bottom, it appears to be entirely destitute of any submarine chains of mountains analogous to those we have on land; there are no steep valleys, no bare rocks, in fact none of that variety of surface which on dry land contributes so much to the beauty of the scenery. For incalculable ages a slow but permanent shower of organic débris has been descending from the surface, which, mingling at the bottom with the skeletons of its inhabitants, has formed a uniform layer of a soft calcareous ooze of unknown thickness, covering the accidents of the bottom as a snowstorm levels the hillocks and ditches of our fields. Being entirely unaffected by changes of temperature and of moisture, the ocean bottom cannot show the effects of weather or of erosion, the magnitude of which on the terrestrial relief is as yet greatly underrated even by many geologists. It is only in the northern parts of the ocean (and probably in the southern also) that in a certain sense the traces of atmospheric action on the surface of the bottom can be found, but only mediately. The banks of Newfoundland are, if not formed, at least increased by the sand and pebbles annually brought down, though in small quantities, from the arctic regions by the icebergs, of which this is the great melting ground. The rounded pebbles of basalt found by Wallich between the Faroe islands and Iceland, and the gravel and pebbles observed by Carpenter in the deep-sea dredgings off the Faroes, have probably also an arctic origin, drift ice having been seen, though rarely, very nearly in the same localities. The foregoing remarks apply of course only to the deep-sea basin. On the terrace fringing the continents the force of tidal and other currents has had more effect in shaping the bottom; rocks and coral reefs lift their heads to or above the surface; in a word, there is more superficial variety, but even here it is seldom comparable to many of the subaërial reliefs.

III. Constitution of the Ocean Bed. It has always been the practice in navigation to arm the sounding lead, *i. e.*, to fill a cavity at its base with tallow (the arming). Particles of sand, stones, shells, &c., remain attached to it after a cast, and give, by their proportions, color, or size, indications of the position of a ship, frequently of great value. Hydrographers have devised more convenient means of bringing up specimens of the bottom. In France the sounding lance is mostly used, a pointed bar of iron projecting under the lead, and provided with notches or barbs in which the sand or mud remains. In the United States coast survey the characteristic specimens of bottom are preserved with care, in the first place as vouchers of the correctness of the data given on the charts, and secondly for purposes of scientific investigation. Lieut. Stellwagen, U. S. N., while on coast survey duty, proposed a simple instrument for bringing up specimens, which, under the name of the Stellwagen cup, has been extensively and satisfactorily used. It consists in a conical iron cup, screwed into a rod projecting from the base of the lead, and having its opening covered by a loose leather valve. When the lead strikes, the cup is driven into the bottom and fills, and the pressure of the water afterward keeps the cover down while hauling up. A slightly different sounding cup was invented by Admiral Sands, in which the opening into the cup is at the side and kept closed by a spring, which opens only when the cup is penetrating into the soil. In Brooke's sounding apparatus, before mentioned, the cavity at the end of the rod was at first filled with quills in which the mud lodged; later a valve was provided which was pressed over the opening by the sliding off of the cannon ball. The quantity brought up in that way was, however, always very small. The greater part of the extensive collection of specimens of soundings in the coast survey office in Washington have been procured with the Stellwagen and the Sands cups. In England the Bulldog machine, so called, has been successfully used for some years. It is a modification of Capt. Ross's clams, and consists of a pair of scoops closing against each other and thus bringing up a considerable quantity of material. The results obtained by these different methods have been laid down in maps, in France by M. Delesse and in America by Mr. Pourtalés, and thus a general idea of the geology of the bottom of the ocean has been obtained, or rather of its lithology, as M. Delesse has called it; for under water it is only the superficial layer which is brought to our knowledge; of its thickness, superposition, &c., the sounding lead can give us no idea. From these researches it appears that on the coast terrace there is, as might be expected, a great variety in the constitution of the bottom. It reflects as it were the geological formations of the adjacent shore, but with this difference, that the movement of the water produces a sifting action when agitated by the tides, winds, or currents, the heavier and harder particles remaining alone in some localities, while the lighter and finer materials are transported and deposited in others. This accounts in part for the immense preponderance of silicious sand in the deposits of the terrace, since it is the result of the decomposition of most of the primitive

rocks and of the sifting out of many of the secondary and tertiary formations. Limestones, being generally soft, are reduced to impalpable powder and form deposits of calcareous mud; while argillaceous mud results from the decomposition of clay slates, marl, and true clay beds. Large pebbles or shingle are rare at a distance from the shore, though common enough on the beaches. They seem to be covered by finer materials, except where swept by currents, as for instance in the British channel, where several banks of flints from the decomposed chalk beds are known to exist. But besides the deposits of which we have spoken, resulting from decomposition or remodelling of preëxisting ones, there are real formations on a very large scale now going on. The lime dissolved in the sea water is assimilated by organized beings, animals or plants, secreted in solid form, principally as a carbonate, and, after having performed a short duty in the organic world, contributes in the form of a new inorganic body to the increase of the earth crust. Thus we see in the vicinity of coral reefs the bottom composed of calcareous mud or sand formed by the dispersion of corals, shells, and echinoderms, and in shoaler parts largely by the decomposition of lime-secreting seaweeds. This mud or sand often consolidates into hard limestone rock, but more frequently when exposed to the atmosphere than when it remains under water. But it is chiefly in the deep-sea bed that lime deposits produced by organized beings assume gigantic proportions, at least in horizontal extent. The entire bed of the ocean as far as explored, outside of the coast terrace, is covered by a uniform layer of soft calcareous mud, called ooze by sailors, and composed chiefly of *foraminifera*, low organisms forming minute chambered shells, and living partly on the bottom and partly near the surface, whence they sink after death. With them are mixed the shells of floating mollusks, such as pteropods, of other mollusks inhabiting the bottom itself, the tubes of worms, the remains of *bryozoa*, echinoderms, corals, &c. Some silica is contributed, but in smaller proportions, by analogous process performed by sponges, *polycystinæ*, and *diatomaceæ*. It is, in a word, chalk in process of formation, and has been found throughout the tropical and temperate regions; in the arctic seas observations are still wanting. Along the coast of the United States the terrace is principally sand. Mud is found in the deep gulf between Cape Cod and Cape Sable, S. of Nantucket, Martha's Vineyard, and Block island, for a distance of nearly 80 m. (Block island soundings), in the so-called mudholes off the entrance to New York harbor, and in a few other localities. A few rocky patches of small extent are found off the New England coast, near New York, and along the coast of the Carolinas. At Cape Florida the sand is replaced by the coral formation which envelops the southern extremity of the peninsula, and which may be divided into two, the reef formation and the deep-sea coral formation; the former extends from the shores to a depth of about 90 fathoms, but receives its supplies almost solely from a region between the surface and 10 or 15 fathoms, where the reef-building corals live. The second or deep-sea coral formation extends from 90 fathoms to about 300. Beyond this depth, and sometimes even from 100 fathoms downward, the deep-sea ooze or foraminifera mud is found everywhere. IV. Currents. Columbus, according to Dr. Kohl's "History of the Gulf Stream," was the first navigator who observed ocean currents, having noticed that in sounding in the Sargasso sea the lead appeared to be carried away from the ship, a fact which he rightly interpreted by the ship being drifted away from the lead by a surface current. In some of his later voyages he also observed the rapid flow of water through the passages among the Antilles, and the strong currents in the Caribbean sea and on the coast of Honduras. Sebastian Cabot noticed the Labrador current about the same time. The first notice of the Gulf stream, the most important of the currents of the Atlantic, is found in the journal of Alaminos, the pilot of Ponce de Leon in the expedition which led to the discovery of Florida in 1513. Alaminos, making use of his discovery, led the way in sailing down stream through the strait of Florida when carrying Cortes's despatches from Vera Cruz to Spain. In the narratives of the navigators of the 16th and 17th centuries frequent mention is made of the ocean currents, and in particular of the Gulf stream; it is therefore not a little singular that their details were so imperfectly known as late as the second half of the 18th century that they were rather an impediment than a help to navigation, at least for the intercourse between Europe and the northern parts of America. The New England whalers at that time were the best acquainted with the limits of the Gulf stream, and from one of them Benjamin Franklin obtained the information which he published in his chart of that current, intended to point out the most favorable routes between the North American colonies and the mother country. Franklin and Blagden also pointed out the difference between the temperature of the water in the Gulf stream and outside of it. Pownall and Jonathan Williams extended our knowledge of this current; Capt. Strickland remarked its extension further N. and E. than was before suspected, and first argued the existence of the N. E. branch of the Gulf stream, about which there has been so much controversy of late. Humboldt and Scoresby also paid much attention to ocean currents, and particularly to the Gulf stream. Finally, Major Rennel undertook the discussion of all the observations of currents, and published the results of his generalizations under the title of "Investigations of the Currents of the Atlantic Ocean," a work which remains to this day the principal source of information on the subject.

The circulation of the water in the Atlantic ocean can be stated in very general terms to consist of two gigantic eddies or revolving streams, the one in the northern Atlantic, the other in the southern or Ethiopic basin; the former revolving from left to right, the other from right to left; both giving out offshoots of greater or less importance on their outer circumference. Both originate in the equatorial current, which consists of two parallel parts, the northern and southern, separated by a narrower return current, called the Guinea current. The southern equatorial current, starting from the coast of Africa and striking the coast of South America at Cape San Roque, divides itself into two branches. The southern one follows the coast of Brazil under the name of the Brazilian current, dividing about the latitude of the tropic of Capricorn into two branches, the smaller one following the coast, but gradually growing narrower and weaker, nearly as far as the extremity of South America. The larger and wider portion strikes toward the southeast in the direction of the Cape of Good Hope, under the name of the southern connecting current; a short distance west of this cape the current turns north and follows the coast of Africa, under the name of the South Atlantic current, toward the equator, where the circuit is completed. This current is accompanied in its northern course, and between it and the coast, by a branch of the cold Antarctic current, the waters of which can be traced for a long distance by their temperature. The northern branch of the south equatorial current follows the coast of South America from Cape San Roque to the Antilles, where it penetrates into the Caribbean sea, jointly with the larger north equatorial current. Thus a portion of the waters of the South Atlantic is carried into the North Atlantic, for which apparently no return is made as far as surface currents are concerned. After entering the Caribbean sea, the current is driven through the straits of Yucatan into the gulf of Mexico. The principal mass of the water then turns to the eastward along the northern coast of Cuba, while a smaller and less known branch is said to follow the western and northern coasts of the gulf, ultimately falling in again with the former. After passing the southern extremity of Florida the current receives the name of the Gulf stream, and passes north through the narrows of Bemini between Florida and the Bahama banks into the Atlantic ocean. It now follows the coast of the United States at a somewhat variable distance to about the latitude of Chesapeake bay, when it turns east. On the S. side of the banks of Newfoundland it is pressed in by the polar current, and according to some authors ceases to exist as a special current. It is most probable that a portion of its waters continues its course eastward across the ocean, bending south between the Azores and the coast of Portugal, and finally returning along the coast of Africa to the equatorial current, and thus completing the circuit. A small offset enters the Mediterranean through the strait of Gibraltar. Another small branch separates at Cape Finisterre, sweeps around the bay of Biscay in a northerly direction, and dies out finally on the coast of Ireland. This is Rennel's current, named so after its discoverer. From the region east of the banks of Newfoundland, the waters of the Gulf stream or of the general ocean drift (the question being disputed) move northward toward the coasts of northern Europe, to which they carry their heat, passing the North Cape, and reaching nearly to Nova Zembla. Interweaving with the polar current, a branch passes up the N. coast of Spitzbergen, another around the west to the N. coast of Iceland, another along the W. coast of Greenland into Davis strait. A polar current, carrying large quantities of ice at certain seasons, descends along the W. shore of Davis strait and the coasts of Labrador and Newfoundland, and passes, part of it under the Gulf stream, and part between that stream and the coast of the United States.—*Cause of currents.* The various theories propounded to explain the circulation of the water in the ocean have been based—1, on the effect of permanent winds; 2, on differences of density due to evaporation; 3, on differences of density due to temperature; 4, on the rotation of the earth; 5, on difference of barometric pressure; and finally, on combinations of these causes. The first author to leave a theory of currents was Kepler, who attributed them to the rotation of the earth, remarking that as the water is only in loose contact with the earth, it cannot follow the rotation eastward as fast, and remains behind. He was followed and sustained by Varenius in 1650. Vossius and Fournier a little later adopted the heat and evaporation theories, but in a rather extravagant form, the former supposing the heat of the sun to expand and attract the water of the ocean into a kind of long mountain ridge, which, following the sun, broke on the coast of America, producing the currents running along the shore; a curious glimpse of the usual tidal theory. Fournier supposed, on the contrary, a hollow or valley formed by evaporation in the ocean in the tropics, causing a constant rush of the polar waters to fill it up. Coming down to Franklin, we find him an advocate of the trade-wind theory for the Gulf stream, while, later, Humboldt explained the phenomenon by the rotation of the earth. Major Rennel, in his work on ocean currents, divides the currents into two classes. Drift currents, according to him, are the effect of the permanent winds on the surface of the water, by which the superficial layers are set in motion; when a drift current meets with an obstacle, the general surface is raised by accumulation, and the water in trying to return to its level produces a deeper and generally more rapid flow called a stream current. The equatorial current is an example of the former, the

Gulf stream of the latter. It would take too much space to detail all the theories of modern authors, but a few must still be mentioned. Capt. M. F. Maury gave an exaggerated weight to differences of density of sea water in northern and southern parts of the ocean. Sir John Herschel, in his article on physical geography in the "Encyclopædia Britannica," attributed the currents to the effect of the trade winds. Before his death he seems to have fallen in with the views of Prof. Carpenter mentioned under the head of Gulf stream. Dr. Mühri of Göttingen, in his work on ocean currents, gives the following conclusions: 1. There are in ocean circulation two great movements perpendicular to each other, the one following the equator, the other the direction of the meridians. 2. The equatorial circulation results from the inertia of water with regard to the rotation of the earth; the meridional or thermometric circulation is caused by the difference of temperature between the polar and equatorial regions. 3. The meridional as well as the equatorial circulations exhibit two motions in contrary directions, which compensate each other and are superposed to each other in part in the thermometric circulation, on account of their unequal density. 4. The unequal distribution of the continents impedes the regularity of the great movements of circulation, and, in conjunction with the unequal relief of the bottom and the action of the winds, induces secondary currents disturbing the general motion. —*Gulf stream.* The importance of this great current to the commerce and navigation of North America, to which reference has been made before, the great scientific interest it presents by its size, temperature, and influence on climate, have made it, in the words of Prof. Bache, "the great hydrographic feature of the United States coast." Under the superintendence of the late Prof. Bache, the United States coast survey has accumulated a large number of observations of that part of the stream comprised between its entrance into the straits of Florida and the region where it leaves the coast after having changed its course to the east. The observations were directed chiefly toward the determination of the depth, the figure and constitution of the bottom, and the temperature from the surface down through the whole depth. The instruments used for temperature have been of various construction. Metallic thermometers in the watch form were used, enclosed in strong brass vessels; they answered well enough, and were employed to a considerable extent in the earlier researches; but in several instances the brass box was crushed by the pressure. Self-registering thermometers in glass globes were used also, but they had the inconvenience of experiencing the changes of temperature too slowly. Six's self-registering thermometers were used extensively, up to about 100 fathoms, beyond which they are liable to be crushed; and in all cases their indications are rendered very erroneous by the pressure. For great depths Saxton's metallic thermometer has been of great service. This instrument consists in a ribbon of two metals of different expansion, soldered together and rolled in a cylindrical spiral around a spindle, to which the movement of expansion or contraction is communicated, and by it transferred to a hand or needle moving an index over a graduated dial. The whole is enclosed in a suitable case perforated for the passage of the water. It works well, but is affected by pressure in a manner not easily explained. At present the Miller-Casella protected thermometer is used, and proves an excellent and trustworthy instrument. It is in the main a Six's self-registering maximum and minimum thermometer, the bulb of which is protected from pressure by an outer bulb blown over it and sealed round the neck, a space being left between the two bulbs, partially filled with alcohol, in order to communicate the temperature more rapidly to the inner bulb. The observations were made at a number of stations in lines or sections at right angles to the stream. The thermometer was observed at the surface and at different depths, generally at every ten fathoms as far as 50, and at every hundred fathoms in greater depths. When the change of temperature was very rapid, the number of sections, stations, and observations was multiplied to keep pace with it. The results were arranged afterward in diagrams, where the changes of temperature were represented by curves, thus giving at a glance the distribution of heat throughout the stream. From these observations the following general deductions were made: In the sections between Florida and Cuba the highest temperatures were found near the Cuban coast, where also the greatest depth was recorded. It was observed by Mr. Mitchell that very near the coast of that island the stream had a uniform velocity and constant course for a depth of 600 fathoms, although in this depth the temperature varied 40°. The stratum of warm water was found to be of much greater thickness or depth toward the middle of the straits than nearer shore; thus at a distance of 6 or 7 m. from Havana the layer of water above the temperature of 70° extended only to a depth of about 70 fathoms, while some 30 m. off the coast its thickness was about 180 fathoms. The slope of the bottom is very abrupt on the Cuban coast, but much more gradual on the Florida side, where the current is also more irregular, taking sometimes even the shape of a counter current running west. It is also here affected by the winds and tides. The same character as in this section is maintained throughout the straits of Florida to the narrows of Bemini. No permanent current was found in the St. Nicholas and Santarest channels, sometimes regarded as partial feeders of the Gulf stream. Toward the narrows of Bemini the breadth and depth of the straits diminish and reach their minimum, the breadth being only 44 m. and the greatest depth 370 fathoms.

The bottom presents here some inequalities in the shape of longitudinal ridges, the effect of which is to press the cold water of the bottom toward the surface, by which the first indication is produced of those alternate bands of warmer and colder water noticed further north. The warmest water is still found nearer the eastern or right bank of the stream; but after leaving the straits, and when the stream has gradually widened, the warmest water is on the left or western edge. The stream now runs parallel to the coast, distant from it about 70 or 80 m., turning gradually to the N. E. from the due N. course it had on leaving the narrows. It approaches nearest to the land at Cape Hatteras, takes there a slightly more northern direction, and shortly after turns sharply to the east, its rather variable western edge being then about lat. 38°. The space between the shore and the stream is occupied by the cold water of the polar current, and the contrast between it and the warm water becomes more and more abrupt, particularly at some depth, so that the plane of separation received from Lieut. Bache, who first noticed it, the name of the cold wall. At the surface the warm water overflows the cold, forming a thinned-out superficial layer, the limits of which vary somewhat according to the seasons and prevailing winds, certainly much more than the main body of the stream. The bands of cold and warm water increase in number, from three warm ones when coming out of the narrows to six or seven in the section off Sandy Hook; it must however be remarked that several of them are very vaguely defined and far from constant. In the same section the depth of the stream is still very considerable, its limits being nearly as well marked by the difference of temperature at 400 fathoms as it is nearer the surface. In the following tables the temperatures of the water at different depths are given in a form nearly as plain as in a diagram for two of the sections. The first is for the section between Cape Florida and the Bemini islands. The full line represents the surface; above it are given the distances from Cape Florida. The depths are given on the side, and are indicated across the table by dotted lines for every hundred fathoms. The figures of the first line give the temperature from the average of the observations taken at the surface and at 5, 10, 20, and 30 fathoms; of the second line the average at 50, 70, 100, and 150 fathoms; and in the third are combined the temperatures at 200 and 300 fathoms. The figures arranged vertically over each other represent observations taken at the same station. Table II. is a similar arrangement of the observations in the section off Sandy Hook (New York). The first line gives the temperatures at the same depths as the first line of Table I.; the second line gives the averages of the observations at 40, 60, 80, and 100 fathoms; the third of the same at 200 and 300 fathoms; and the fourth the observations at 400 fathoms:

TABLE I.

FATHOMS.	MILES FROM CAPE FLORIDA.																				
	0				10				20				30				40				
0	73		74			77		78			78		79		79		80		80		
100						65		69			69		73		70		75				
200	Steep slope to Cape Florida.																			Very steep slope to Bemini.	
								44			44		47		43		54				
300																					
																					Greatest depth.

TABLE II.

| FATHOMS. | MILES FROM SANDY HOOK. | | | | | | | | | | | | | | | | | | |

straits of Florida into the gulf of Mexico, is rendered very improbable by Mr. Mitchell's observations cited above, and by the volume of water necessarily passing through these straits to supply as large a cross section as we find off New York. It is much more probable that the cold water at the bottom of the gulf of Mexico reaches it by a much longer circuit, and perhaps a very small portion by the counter currents at Cape Florida.—The surface velocity of the Gulf stream appears to be variable, being probably affected by the wind; but although we have as yet no observations of the velocity at various depths, it is safe to assume a much greater constancy for the bulk of its waters. According to the chart of the Atlantic ocean published by the hydrographic office in Washington, the rate of the current in the straits of Florida is from 1 to 4 m. per hour; in the narrows of Bemini, from 1½ to 5 m.; off the coast of Georgia, 1¼ to 4 m.; off Cape Fear and Cape Hatteras, 1¼ to 3¾; off Chesapeake bay, 4 m.; and in the longitudes of Nova Scotia and Newfoundland, between 2 and 3 m. Mr. Findlay estimates it rather less: about 2¾ m. per hour in the narrows of Bemini, 2½ off Charleston, 1½ to 2 off Nantucket, and a little over 1 m. S. of the Newfoundland banks. Accurate observations at all seasons and at various depths, though difficult to make, are very much needed.—The further course of the Gulf stream after passing the banks of Newfoundland is involved in some doubt, as has been mentioned in speaking of the general system of currents of the Atlantic ocean. That water of a higher temperature than is due to the latitude reaches the northern and eastern shores of the Atlantic appears to be universally admitted. Capt. Strickland seems to have been the first to attribute this fact to the extension of the Gulf stream, and was supported in this opinion by the authority of Humboldt and Scoresby, the latter having made a large number of observations of temperature in the Arctic ocean. Leopold von Buch, struck during his travels along the coast of Norway with the luxuriance of the vegetation in so high a latitude, the high level of the line of permanent snow, the freedom from ice of the harbor during the greater part of the winter, &c., attributed to the Gulf stream the office of bringing heat to these coasts; and his reasoning appeared to Humboldt "perfectly convincing." Gen. Sabine, during one of his voyages for pendulum experiments, made numerous observations in the Gulf stream proper, and in its supposed extension across the ocean, and along the coasts of Europe, south of England and Africa, and was convinced that both were one and the same system. Rennel was the first to shake this belief, at the time almost universal, attributing the whole easterly and northerly movement of the waters to a superficial drift produced by the prevailing S. W. winds. It must be remarked that he ignores entirely the effect of the rotation of the earth, and of the heating and cooling of the waters at the equator and pole, joint causes which Arago was probably the first to exhibit, without, however, entering into their discussion. In very recent times the partisans of both opinions have shown a renewed activity, partly in connection with arctic, and partly with deep-sea explorations. It was in reference to the former that Dr. Petermann gave his opinion as follows: "Instead of a weak and insignificant drift from Newfoundland toward Europe, as heretofore represented, I consider the northern part of the Gulf stream one of the mightiest currents of the world, although comparatively slow, not very perceptible on the surface of the ocean, and therefore of no great moment to navigation. I do so because ocean currents have to perform other functions than merely those of a strong surface stream. In that view I conceive the Gulf stream to be a deep, permanently warm current from Newfoundland to the coasts of France, Great Britain, Scandinavia, and Iceland, up to Bear island, Jan Mayen, and Spitzbergen; and along the western coast of the latter up to the 80th degree of north latitude, thence to Nova Zembla into the polar sea, passing the northernmost capes of Siberia and the New Siberian islands, where it appears on the charts as the Polynia of the Russians, . . . its influence being felt perceptibly even as far east as Cape Yakan." Numerous opponents have risen against these assertions, among them Mr. Findlay, who contends that the Gulf stream proper has not sufficient width and depth to reach the coast of Europe; that at its slow rate of progress it must lose all its heat during the passage; that after reaching Newfoundland it is totally annihilated by the Polar stream, and cannot be perceived beyond; that the Gulf stream has nothing to do with the climate of northwestern Europe, which is affected only by the general drift of the North Atlantic ocean. To this Dr. Petermann replies that the Gulf stream is no doubt reënforced by a drift corresponding to it in direction, in the same way that a river is swelled by tributaries, without for all that losing its individuality and its name. Prof. Carpenter, in discussing the results of his deep-sea temperature observations, doubts if the Gulf stream sends any but a very small and superficial contribution to the northern seas, and is supported by the companion of his researches, Mr. Jeffreys, on zoölogical grounds, the latter rather premature, since we are still at the dawn of our knowledge of the deep-sea fauna. Dr. Petermann now took a very important step in the question; the differences of opinion resting chiefly on belief and theory, he undertook to collect all the observations of temperature of the water in the North Atlantic and construct charts of isotherms for every month in the year. The large amount of materials buried in Maury's wind and current charts were made available by much labor; the observations pub-

lished by the Dutch government and by the Scottish and Norwegian meteorological societies, the records of sea temperatures of some of the transatlantic steamship lines, those of the Danish ships sailing to Iceland and Greenland, collected by Admiral Irminger, and those of various arctic expeditions, furnished a considerable array of data. Of the twelve monthly charts contemplated, two only have been published, those for January and July. The chart for July exhibits the core of the Gulf stream at a temperature of 81·5° extending northward as high as lat. 38°, and with a temperature but slightly decreased as high as lat. 40°, and as far east as lon. 43°. That it is not a mere drift is shown by the lower temperatures south of this tongue, which in January is shortened as might be expected. At Newfoundland the curves show the inroad made by the polar current, but in a less marked manner in winter than in summer. In July the polar current brings water at a temperature of 45·5° down to lat. 50°, while further east the Gulf stream water has still 65° in the same latitude. To the east of Newfoundland the isotherms set toward the north with two bends more marked in summer than in winter. In July the isotherm of 54·5° advances toward Iceland and the Faroe islands to lat. 61°. The warmer water follows not only the W. coast of Iceland, but passes round to the N. side of it, while on the E. and S. coast the polar current preponderates, producing a temperature lower by 5° or 6°. Between Iceland and the Faroe islands warm and cold bands of water alternate, the result of the struggle between the Gulf and polar streams, the latter carrying drift ice much further south in this region than anywhere else east of Iceland, and reducing the temperature of the water at the Faroe islands to a lower point than it has on the W. coast of Iceland, where the winter climate is not as severe as it is in many parts of New England. The isotherm of 36°, which touches Iceland in winter, extends at the same season beyond North cape; the sea at Fruholm, North cape, is in January still at a mean temperature of 37·9°. Observations are wanting to show the further extension of the Gulf stream toward the northeast. It is met by a polar current running in the opposite direction, and cut by it into two branches, of which one runs along the W. side of Spitzbergen, the other eastward of Bear island. The further progress of this branch, which is the main one, is not known. The branch of the polar stream separating the two arms sets toward the coast of Greenland, where it is said to form a bight in the drift and field ice, reaching nearly to the coast.—In high latitudes deep-sea temperatures show in many localities an anomaly in this, that the coldest are observed near the surface, and that there is an increase of temperature with depth. Observations in the Antarctic ocean have shown the same phenomenon. It is frequently explained by comparison with the same phenomenon in fresh water, the maximum density of which is 7·2° higher than the freezing point. Although with regard to salt water the question appears still unsettled, the weight of evidence seems to point to an increase of density in the latter down to the freezing point. In that case the colder surface temperature might be attributed to the stratum of water from melting ice, floating over warmer layers because of less density.—Some light has been afforded as to the course and origin of the currents in the northern seas by the driftwood and other materials thrown by them on the shores. The northern coast of Spitzbergen is covered with immense accumulations of driftwood, bark, pumice stone, &c.; among them Torrel found a large bean of *entada gigalobium*, a product of tropical America found on all the shores washed by the Gulf stream, from Florida to Norway. These beans are found even in the Danish colonies on the W. coast of Greenland, where they are known under the name of *vettenyrér* or witches' kidneys. The seeds of *mucuna urens* and *mimosa scandens* are generally found with the former. The driftwood was pronounced by botanists to be nearly all Siberian larch, thus proving that the sea is open in summer as far as the mouths of the great Siberian rivers, and that in the locality mentioned the waters of the Gulf stream mix with those of the polar current. The saltness of the water in different parts of the ocean, as determined by Prof. Forchhammer, was laid down on a chart by Dr. Petermann, and found to agree remarkably well with his temperature charts, the warmer or Gulf stream water being more salt than the colder or polar stream. From all the points discussed in his paper, Dr. Petermann draws the following conclusions: 1. The Gulf stream extends along the North American coast with a temperature of 77° and upward as far as lat. 37°; a temperature in winter higher than the temperature of the air in Africa under the same latitude, and higher than the temperature of the water at any time under the equator. 2. The Gulf stream turns away from the American coast in lat. 37° to 38° toward the east beyond the banks of Newfoundland to lon. 40° W., where it still has a temperature of about 75° in July and about 66° in January. From there it proceeds to the northeast, surrounding Europe to the Arctic and the White sea with a permanent current of warm water, still having a temperature of 37·8° in a latitude in which in Asia and America the mercury remains frozen for months. 3. The velocity and strength of the stream are still imperfectly known. Findlay estimates the time for the water to travel from Florida to Europe at one or two years; Dr. Petermann, at two months. 4. The Gulf stream must be a deep and voluminous body of water, keeping away the polar ice from the coasts of Europe. The polar current presses at three places against it, E. of Newfoundland, E. of Iceland, and at Bear island. 5. These polar currents make a much

deeper impression in the Gulf stream in summer than in winter. 6. In winter the Gulf stream is cut in upon much less. The polar streams are then less powerful, the polar ice being fast in the north. This is shown by Mr. Redfield's observations on the drift ice off Newfoundland. Of 100 cases of ice seen, 87 occurred in April, May, June, and July; of the remaining 13, there were 7 in March, 3 in August, 2 in February, and 1 in January; none at all in September, October, November, and December. 7. The relations of temperature within the Gulf stream itself are about the same in winter and in summer; the fluctuations between its maximum and minimum would be only about 9°.—The thermometrical results of the deep-sea expeditions in the European seas in the steamers Lightning and Porcupine in 1868, '69, and '70, have been used by Prof. Carpenter, under whose charge the observations were made, for a theory of ocean currents based on the heating and cooling of the water at the equator and pole respectively. The remarkable fact was brought out during the first cruise that in the channel between the Faroe islands and the N. coast of Scotland a warm area exists on the bottom in close proximity to a very cold one. The warm area, S. W. of the Faroe islands, had a temperature of 41·4° at a depth of 767 fathoms; the cold area, only 20 m. distant, between the Faroe and Shetland islands, only 29·7° at 640 fathoms, the surface temperature being the same. Near the Rockall bank off the W. coast of Ireland the temperature of 41° was found to extend to 775 fathoms, with a bottom temperature of 37·4° at 1,400 fathoms, and off the bay of Biscay to 800 fathoms, with a bottom temperature at 2,435 fathoms of 36·5°. Prof. Carpenter remarked on these results that the elevation of temperature in the warm area above the isotherm of its latitude could only be attributed to a supply of water from the southwest; and that the Gulf stream, meaning the warm water coming through the narrows of Florida, if it reached this locality at all, which he considers very doubtful, could only affect the most superficial stratum; and that the same could be said of the surface drift caused by southwesterly winds. He comes to the conclusion that the presence of the body of water ranging from 100 to 600 fathoms in depth, and the range of temperature of which is from 48° to 42°, can scarcely be accounted for on any other hypothesis than that of a great general movement of equatorial water toward the polar area, of which the Gulf stream constitutes a peculiar case modified by local conditions. The arctic stream in the cold area is also a peculiar case of the general movement of the polar water toward the equator; for it is forced to pass through this, the deepest channel between Iceland and Europe, and pressed toward its S. E. shore on account of the channel's oblique position with regard to the N. and S. flow of the water. Prof. Carpenter is inclined to think that the Arctic ocean is insufficient to supply cold water enough for so great a reduction of temperature as is found in the body of water below 1,000 fathoms in the Atlantic basin, and thinks that antarctic water may also flow in past the equator as far as the tropic of Cancer; a question rather difficult to settle in the present state of our knowledge, since all we know is that under the equator bottom temperatures have been observed of 35·2° at 1,806 fathoms, and 33·6° at 2,306 fathoms. The best evidence adduced by Prof. Carpenter for the flow of polar water on the bottom toward lower latitudes is based on his deep-sea temperatures of the Mediterranean. This closed body of water communicates with the Atlantic through the strait of Gibraltar alone, and that is too shallow to allow of a communication between the deep waters of the two basins. The Mediterranean goes down in some parts to 2,000 fathoms. The surface is hot in summer, as high as 78° sometimes, but the hot layer is shallow, 10° or 15° being lost in the first 30 fathoms. At 100 fathoms the temperature is generally 54° or 55°; beyond that depth no further reduction was observed; "whatever the temperature was at 100 fathoms, that it was at the bottom;" and this temperature is found to be the permanent temperature of the surface of the earth in that latitude. The same observer concludes that the ocean is subjected to two different circulations: a horizontal one produced by the action of the wind, the Gulf stream being an example of it; and a vertical circulation dependent on opposition of temperature. V. Life in the Atlantic Ocean. —1. *Vegetation.* The flora of the ocean, or nereis, as it has been called, is confined to a narrow belt along the shores and to the surface layer of water in mid-ocean, a strong light being necessary to its existence. With the exception of a few species of the family of *zosteraceæ* (eelgrass, turtlegrass, grasswrack), the whole submarine vegetation belongs to the algæ, plants of low organization. The limits of depth to which certain families, genera, or species are confined, are much more definite than they are for animals; they have been called zones by Edward Forbes, characterized by the prevailing types growing in each. Commencing at the surface, he called littoral zone the region between high and low water, which on rocky shores is characterized by a luxuriant growth of *fucaceæ* principally, of which different species form further subdivisions of the zone, according to their preferences for a longer or shorter exposure to the air. Below low-water mark the laminarian zone begins, and extends to 4 or 5 fathoms; in it are found in abundance the *chondrus crispus* or carrageen, the thong weed (*himanthalia*), and the tangle or devil's apron (*laminaria*). In the lower part of this zone are found the red and purple seaweeds, many of them of great delicacy and beauty. The next zone is that of the

corallines, so named from a family of seaweeds having their tissues filled with lime and simulating small corals. As a general rule seaweeds do not grow much deeper than 8 or 10 fathoms, though there are exceptions; thus the gigantic *macrocystis pyrifera*, found growing in 40 fathoms, and rising to the surface at an angle of 45°, and streaming on it for a distance of several ships' lengths, has been estimated to have a total growth of 700 feet. Low forms of corallines have been found at more than 200 fathoms, and *diatomaceæ* at all explored depths. The geographical distribution of seaweeds depends much on temperature and currents. The *laminariæ*, for instance, prefer cold water, the *sargassa* the warmest. The largest forms are found in colder water, as the *laminariæ* in the north, the *macrocystis*, *Lessonia*, *Durvillea*, &c., in the south. As examples of the influence of currents on the distribution, we may take *padina paconia*, a West Indian species, not found in America N. of the Florida keys, but carried to the S. shore of England probably by the Gulf stream. The *macrocystis* and other large antarctic seaweeds luxuriate about Tierra del Fuego and the Falkland islands; they are carried far toward the equator by the Peruvian current on the W. coast of South America, while they are kept back on the E. coast by the southerly extension of the Brazilian current. A very remarkable feature of ocean vegetation is the Sargasso sea. This name is commonly used to designate a region of the Atlantic covered by a peculiar floating seaweed, either in tangled masses of considerable extent, compared by some writers to floating prairies or submerged meadows, or simply in scattered sprigs. Columbus, as is well known, passed through these fields of seaweed in his first voyage, to the great alarm of his companions, who from previous association would naturally imagine a connection between seaweeds and rocks or shoals. Since that time, for nearly four centuries, observation has shown that the geographical position and the abundance of these plants remain essentially unchanged. Humboldt found that the gulf weed, as it is generally called, because found also in the Gulf stream, was distributed in two principal masses, the largest situated a little to the west of the meridian of Fayal and between the parallels of 25° and 36° N. Northwest winds are said to carry it sometimes to the latitudes 24° to 20°. The second or lesser bank is less known, according to the same author, and occupies a space between the Bahamas and Bermudas. Capt. Leps of the French navy has investigated the subject more recently, and places the principal bank between lon. 29° and 45° W., and lat. 21° and 33° N., with smaller scattered masses extending several degrees beyond these limits on all sides. The smaller bank he found not so well defined, the denser portion forming a band extending to the N. E. of Porto Rico and to the latitude of Bermuda. The Sargasso sea corresponds to the great centre or eddy of the North Atlantic system of currents, of which the Gulf stream forms so important a part. The botanical name of the gulf weed is *sargassum bacciferum* (Agardh), not *sargassum natans*, as it is usually called in books of navigation, which is a species growing on rocks in the West Indies. It is generally found in sprigs a few inches long, with a main stem branching into secondary ones; the main stem has frequently a decaying end, while the other gives rise to fresh-growing leaves; but there is never any trace of root or place of attachment. Between the leaves, which are elongated and sharply serrate, small round air vessels, the size of currants, are supported on short peduncles. These air vessels or floats are vulgarly taken for the seeds or fruits; hence the name, derived from a Portuguese word meaning grapes, and the French names of *raisins de mer* and *raisins du tropique* (sea grapes and tropic grapes). Far from being seeds, it is a singular fact that the plant has never been observed to produce a fructification, and that it propagates only by division. Prof. Agassiz has observed that deprived of its floats the plant sinks. Humboldt, in his personal narrative, thought it might possibly grow on an undiscovered bank of 40 or 60 fathoms depth. This opinion he afterward abandoned; but as it is still current among some persons, it may be stated here that such a bank in mid-ocean would have revealed itself by discoloration of the water before now, and to produce the immense masses of floating weed would have to be of considerable size; besides, soundings in different parts of the Sargasso sea have revealed a very great depth of the ocean in that part. It is furthermore well known that fucoids grow only in very moderate depths, the greater number of species being confined between tide marks. Humboldt in later works adopted the more probable supposition that the gulf weed originates and propagates where it is found. To this he was led by the observations of Meyen, who examined several thousand specimens during a voyage across the Sargasso sea, and found them uniformly destitute of roots or fructifications. Robert Brown, however, thought the question of origin still obscure, but that the theory of propagation by ramification and division was highly probable. He thought it possible that it might have originated from some nearly allied species in the gulf of Florida, *fucus natans* for instance, afterward permanently modified by the circumstances in which it had been placed for ages. Harvey, a high authority in the knowledge of seaweeds, who explored the shores of Florida and examined the fresh gulf weed, is also clearly of the opinion that it propagates only by division, whatever may have been the origin of the species. The gulf weed harbors a peculiar fauna consisting of fishes, crustacea, mollusks, and polyps. Among the fishes, a

small *chironectes* is most abundant, which constructs a peculiar nest for its eggs, by fastening several sprigs of gulf weed together. It has been said that no similar accumulation of floating seaweed was known in any other part of the world; but a Sargasso sea, bearing the same relations to the North Pacific currents which the Atlantic one bears to the Gulf stream, is found to the northward of the Sandwich islands, and appears to occupy a still larger space. It is, however, very little known. —2. *Animals.* The cold seas seem to be more favorable to the development of mammalia than the warmer ones. Thus the highest in the scale among those inhabiting the ocean, the polar bear, is found in the furthest north, and is only an occasional visitor of the shores of the Atlantic proper, when carried along by the ice. The seal family is also most numerously represented in the arctic regions; the North Atlantic and Arctic harboring only earless seals, the South Atlantic eared seals likewise. One or two imperfectly known species are reported in the West Indies, and one in the Mediterranean. Of the manatees, which are more fresh-water than marine animals, two species are found on the American tropical shores and one in Africa. The walrus retreats from persecution further north every year, so that its original distribution is uncertain. The same may be said of some of the whales, particularly of the right whales, two species of which have been described from the north, the one confined to the frozen ocean, the other, almost extinct, inhabiting the region between this and lat. 40°. No right whales are found in the tropics, but a third species is found south of the tropic of Capricorn. The finback whales appear to frequent all the oceans except the frozen regions. The sperm whale is found chiefly in the warmer seas, S. of lat. 45° N.; it is said to pass Cape Horn, but not the Cape of Good Hope. Of the smaller cetaceans known as porpoises, the genus *phocæna* is chiefly northern, *delphinus* almost universal.—Of the families of birds frequenting the Atlantic ocean, the ducks have their greatest development in the far north, visiting the temperate regions in winter; they are much more scantily represented in the South Atlantic. The auks and divers are also northern birds, and are in a great measure replaced by the penguins in the southern cold regions. The pelican family flourishes best in the tropics, where it has its large representatives, the pelicans, frigates, phaëtons, &c.; while cormorants and gannets extend as far as the cold temperate zone. The petrels, the most pelagic of birds, are seen in all latitudes, but with a strong preponderance in the southern cold region. The giant of the tribe, the albatross, visits the coast of South America as far N. as the Rio de la Plata. The gulls and terns are seen everywhere.—Of reptiles, the Atlantic has only four species of turtles, inhabiting the warmer seas, and only occasionally carried to higher latitudes by warm currents. Marine snakes, common in the Pacific, are entirely absent in the Atlantic.—The North Atlantic is perhaps of all seas the best provided with useful fishes. The gadoids or cod family, the pleuronects (halibut, turbot, &c.), the herrings and mackerels are nowhere else in such abundance and excellence as on both sides of that ocean. In the tropics the large *serrani* (gropers) are a characteristic group. The bright-colored tropical fishes, such as chetodonts and others, seem to be confined to the same limits as the corals, the coasts of America bathed by the equatorial current. Large representatives of the mackerel tribe, the *coryphæna*, improperly called dolphin, and the flying fishes, are the most common inhabitants of the high seas.—Of crustacea peculiar to the Atlantic, the king or horseshoe crab of North America deserves mention, only one other species of the genus being known, in the Molucca islands. The mollusks are nearly all different in the Atlantic from those in the other oceans, even when so slender a barrier as the isthmus of Panama is interposed. In the Fuegian and South African provinces alone is there a gradual merging through a common fauna with that of the Pacific and Indian oceans. Similar remarks might be made with regard to most of the radiates. Most of the known living crinoids inhabit the Atlantic. The corals are distributed altogether in accordance with the warm current. The W. coast of Africa, washed by comparatively cold currents, has scarcely any. The coast of South America, receiving warm water from the equatorial current, has a greater abundance, though their growth is checked by the fresh water and mud of the great rivers. But they flourish in the West Indies and as far north as Bermuda, under the influence of the Gulf stream and other warm water currents. The West Indian coral fauna is destitute of true *fungiæ* and of *pocillioræ*, both so common in the Pacific. It has on the other hand a great abundance of *gorgoniaceæ* (sea fans, sea feathers).—For ocean life at great depths, see DREDGING.

ATLANTIS, according to the tradition of the Greek geographers (in which some recognize a vague knowledge of America), a large island in the Atlantic ocean, to the west of the N. W. coast of Africa and the pillars of Hercules. It was fabled to possess a numerous population, begotten by Neptune of mortal women. The sea kings of Atlantis were said to have invaded the west of Europe and of Africa, and to have been defeated by the Athenians and their allies. The inhabitants finally became desperately wicked, and the island was swept away by a deluge. Plato mentions the island in his Timæus. On the old Venetian maps, Atlantis is put to the west of the Azores and Canaries.

ATLAS, in Greek mythology, son of Japetus and Clymene, and brother of Epimetheus and Prometheus. Defeated with the other Titans by Jupiter, he was condemned to bear heaven

on his head and hands. Some stories represent him as a great astronomer, king, and demigod, who first taught man that heaven had the form of a globe. Ovid relates that Perseus, having been refused shelter by Atlas, changed him by means of the head of Medusa into Mount Atlas, on which rested the firmament.

ATLAS (Moorish, *Adrar*, *Dir*, *Jebel Tidla*, or *Jebel Adla*), a mountain system of N. W. Africa, forming the watershed between the Mediterranean sea and the Sahara. It extends under various names from Cape Ghir on the Atlantic to the gulf of Cabes (or Lesser Syrtis), about 1,200 m. It is generally divided into the Greater and Lesser Atlas, and a middle table land. The Lesser Atlas is the range nearest the seacoast; the Greater borders on the desert. But this division, originated by Ptolemy, is unknown to the natives, and no real line of division can be ascertained. In Morocco the Atlas is a continuous chain from which the country slopes N. W. and S. E. toward the sea and the desert; and here it attains its greatest altitude, some of the peaks, as Jebel Miltzin, approaching, and others exceeding 12,000 ft. in height. The height of the mountains generally diminishes toward the east. The middle part in Algeria is divided into the range of the Tell, between the Mediterranean and the Shott plateau or salt swamps, and the range of the Sahara, between the plateau and the desert. The Tell consists of single groups of mountains separated from each other by wide valleys, of which 11 are counted from W. to E. In Algeria the highest point is Jebel Sheliha, S. of Constantine, upward of 7,000 ft.; and Jurjura or Jerjera, between Algiers and Constantine, is upward of 6,000. The chain mainly follows a direction parallel to the coast, but then turns S. E., and takes the name of Jebel Aures, and approaching the coast again, it penetrates into the territory of Tunis. There are several passes, of which the chief is in the Jurjura, the famous Biban, a long, narrow valley bordered by rocks rising precipitously 150 to 200 yards. In the western part of the range is the Bebaoum pass, leading to Tarudant in Morocco, also bounded by perpendicular rocks and precipices. Another defile, frequented by caravans, leads from Fez to Tafilet. East of the city of Morocco snow covers the summits all the year; in Algeria it falls in September and melts in May. The climate is generally very salubrious. The sides of the mountains are covered with forests of oak, cedar, pine, pistachio, cypress, olive, and oleander. The Kabyles occupy the habitable parts of the Atlas. The wild animals are the lion, panther, guepard, hyæna, boar, and bear; and several species of monkey are also found. None of the rivers are navigable, and many are only winter torrents. The Tensift and Draa flow into the Atlantic; the Tafilet is lost in the sands; the Shelliff, the Seybuse, the Kebir, the Rumel, and the Mejerda flow into the Mediterranean. According to a description of a branch of the Greater Atlas from S. to N. near Jebel Miltzin given by the English naturalist Washington, the geological constitution of this part of the range is gneiss, schist, red sandstone, transition limestone, and marl. Capt. Rozet gives the following description of the Lesser Atlas after a careful study: The country of Algeria, covered by branches or plateaus of the Lesser Atlas, is composed of transition schist, gneiss, blue limestone similar to English lias, deposits of alluvium, trachytic porphyry, diluvium, and other deposits. The prevailing rock is a whitish green or blue schist in deformed layers, broken up into numerous fissures filled with white quartz and oxidized iron. The limestone enclosed in the schist is of a saccharoid texture, and of a gray or dark blue color; it forms considerable masses in the mountains of Algeria. The schistose stratum contains garnet and anthracite; it gradually changes to mica schist and then to gneiss. The alluvium is composed of horizontal strata of clay, marl, and rounded pebbles. The mineral wealth of the Atlantic Atlas is but imperfectly known. The Greater Atlas seems to be crossed by veins of copper, iron, tin, antimony, and perhaps gold and silver. The Lesser Atlas has mines of lead and iron; silver, copper, mercury, and plumbago are also found. There are many mineral springs in different parts.

ATMOSPHERE (Gr. *ἀτμός*, vapor, and *σφαῖρα*, sphere), or **Air**, the gaseous envelope of a celestial body or of the earth. At present we know that the sun and planets possess atmospheres, and the revelations of the spectrum begin to show what these atmospheres consist of. That of the sun contains, besides hydrogen and other gases, the vapors of solids and liquids, so highly heated that iron vapor is one of its principal constituents. The atmospheres of Venus and Mars appear similar to that of the earth; those of Jupiter and Saturn, Uranus and Neptune, differ so much from our terrestrial atmosphere, that it is highly probable that these planets possess so high a temperature as not only to keep many solids in the state of vapor, but even to be slightly self-luminous. The moon shows no trace of an atmosphere. When we consider the great amount of oxygen and water combined with the solid portions of our earth's surface, it is highly probable that the volcanic scoriæ and lavas of the moon have long ago absorbed all the air and water which may once have enveloped it.—The atmosphere has been the principal agent in transforming the surface of our earth into what it is: first by disintegrating the rocks; then, in connection with solar heat, starting vegetation; then causing the decay of organic substances, and so forming soil for more profuse organic growth, giving sustenance for the animal kingdom; and finally fulfilling all the functions necessary for the development of all forms of life. The functions of the atmosphere are: to act as the principal conductor of sound waves; to moderate the solar heat, admitting

its reception during the day, and preventing too rapid a loss of it during the night; to carry the waters of the ocean in the form of clouds or vapors over the land; to serve as a mechanical force; and last, but not least, to diffuse the element, oxygen, which sustains the life of all conscious beings. 1. *Mechanical properties.* The first property of the air is weight; hence it is attracted by the earth, and therefore it exerts a pressure, not only downward, but, according to the law of fluids, sideways, upward, &c., as by the mobility of fluid particles any pressure is transmitted in all directions. The direct proof of the fact that the air has weight is, that when it is compressed in a strong flask, the flask is heavier than before. If this flask has a capacity of 100 cubic inches, and 100 more cubic inches of air are pressed in by means of a compression pump, the flask will be found to have gained 31 grains in weight. This is the result when the barometer stands at 30 inches, and the thermometer at 60° F.; but as the air expands $\frac{1}{30}$ part for every inch of decrease in the barometer, and $\frac{1}{490}$ part for every degree of increase of the thermometer, the weight will be so much less if the barometer is lower or the thermometer higher, and *vice versa.* The atmosphere having weight, and being perfectly elastic, causes the lower strata to be denser than the upper. Consequently, if the experiment described be performed on the top of a high mountain, we shall find the weight of the 100 cubic inches of air considerably less than 31 grains; at a height of 14,282 feet the air will weigh only half as much; at twice that height it will weigh only one quarter; at three times, one eighth, &c. In general the law is, that while the height increases in an arithmetical ratio, 1, 2, 3, 4, 5, the weight, and consequently the pressure, decrease in a geometrical ratio, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, &c. On this property is founded the system of estimating heights by determining the pressure of the air, either by weighing by the barometer, or by noticing the temperature at which water boils. Near the surface of the ocean water boils at 212°; if we go 550 feet upward, it will boil at 211°; 1,100 feet, at 210°; 5,500 feet, at 202°; 11,000 feet, at about 192°. The cause of this difference is, that in order to boil water the heat must be great enough to cause the expansive force of the vapor or steam to overcome the atmospheric pressure, and that thus in ascending, this pressure becoming less, a less amount of heat is required. This method, however, is only a rough approximation, and is now abandoned for more delicate methods.—The atmosphere, like all gaseous bodies, possesses elasticity in a most remarkable degree. The effect of this elasticity is seen in the unroofing of houses and bursting outward of windows in hurricanes. A partial vacuum being produced by the rotary motion of the hurricane, the air within expands and lifts off the roof, or bursts open the doors and windows. A similar effect is observed in the expansion of air confined in a bladder, and taken from a low level to a great height. The external pressure being reduced, the air within tends to expand to the same degree of rarity as that without, and with such force as to burst the bladder. It is this property, possessed in the greatest perfection by the gaseous bodies, that renders air so excellent a material for springs, air beds, &c.—The impenetrability of air is its property of preventing another body occupying the space where it is. The diving bell is a good illustration of it, as also of its elasticity; for when sunk to the depth of 34 feet, the water will be forced in, so as to half fill it; at the depth of 100 feet it will be three quarters filled; on drawing it up the air will expand and drive out the water again. This also shows that air may be condensed and expanded by mechanical force. A remarkable law prevails, called after its discoverer the law of Mariotte, to the effect that the volume of the air is inversely proportional to the pressure employed, and therefore also to the reacting pressure exerted by the air on the vessels in which it is confined. This pressure, which in the ordinary condition of the atmosphere amounts near the surface of the ocean to about 15 pounds to the square inch, is thus doubled or tripled if we introduce double or triple the amount of air in the same space, as in the experiment above referred to for weighing the air. Mariotte's law, however, does not hold for excessive pressures, say of 25 or 50 atmospheres, when the volume is not exactly inversely proportional to the pressure; our atmospheric air and most other gases are condensed more for a given pressure, while hydrogen gas forms an exception, and is condensed less than the amount required by Mariotte's law. The shape of the atmospheric envelope of our planet is of course spheroidal like the earth, only it is most likely that its upper surface is still more depressed at the poles than the earth itself, while the air is there colder, consequently more condensed and heavier, than at the equator. The attempts to determine the absolute height of the atmosphere have given different results, according to the different data taken as the basis of the calculation. The most trustworthy data are those founded on the time that on a clear evening the last twilight reaches the zenith, in connection with the laws of refraction and reflection of light; this has given as result a height of about 40 miles for the extreme traces of atmospheric air, in so far as these laws of refraction act in an appreciable manner. It is most likely, however, that the rarefaction expands much further, till at the utmost limit of some thousands of miles it mingles and becomes identical with the interplanetary medium or so-called ether, which, according to some of the latest opinions, is only infinitely rarefied atmospheric air, or inversely, our atmospheric air is nothing but the interplanetary medium, condensed by gravitation on the surface of our planet. The pressure of the atmosphere is

also made apparent by removing the air from the interior of any tube, the lower end of which is immersed in water or any other fluid. This fluid will be pressed up the tube to a height corresponding to the pressure upon its surface. If this be at the level of the sea, water will rise 33 feet and mercury 29 inches. The common suction pump is but such a tube, furnished merely with a piston for lifting out the air, and then the water follows it. The power required is of course equal to the weight of the column of water to be lifted. The pressure of the air is also well illustrated by the common leather toy "sucker"—a disk of soft leather, with a string knotted at one end passed through its centre. When moistened and applied to any smooth surface, care being taken to expel the intervening air, it is attracted to it by the external pressure. By the same principle the patella or limpet, and some other shell fish, hold fast upon the smooth rock. So great is this pressure, that the force exerted upon the body of a moderate-sized man must be about 15 tons —sufficient to crush him, as it inevitably would, if applied to only a portion of the body, but quite harmless when pressing with perfect elasticity everywhere alike, from the external parts inwardly, and from those within outward. Let the pressure be taken off from any portion, as by the cupping instrument, and one is immediately sensible of the power that is exerted upon the parts around, painfully pressing them into the vacant space of the instrument; or if taken from the whole body, as is the case with an aëronaut in a balloon at great height, the result may by the expansion of internal organs prove fatal. Inversely, a great increase of atmospheric pressure may be equally injurious and even fatal, as experienced by divers at great depth under water, or by the workmen engaged in labor in the caissons now employed in forming a foundation for subaqueous structures. 2. *Physical properties.* The most important physical property of the atmosphere is its expansion by heat and contraction by cold. The amount of this expansion or contraction is $\frac{1}{472}$ of its bulk at 32° F. for every degree of temperature above or below that point. At very low degrees of temperature, however, this law does not hold, and cannot do so, as is evident from the fact that if it were absolute the air when cooling to 492° below 32°, that is, at —460° F., would be condensed to nothing. The latter temperature has for this reason been accepted by Clément and Desormes as that of absolute cold, while according to Pouillet the temperature of the outermost limits of our atmosphere is equal to that of the interplanetary space beyond, being about 230° below zero. The expansion of air by heat is easily exemplified by heating air confined in a bladder. Its expansion soon swells the bladder and causes it to burst. As its bulk increases, its density diminishes. The colder and heavier air around it lifts it up. On this principle were constructed the first balloons. It is this principle also that gives rise to the currents of air or wind, the colder air flowing along the surface to fill the spaces left by the ascending warm air. Thus the trade winds blow from the temperate regions toward the torrid equatorial belt. The whirling tornado, and all the phenomena of the winds, owe their origin to local heating and rarefaction of the atmosphere. The rays of the sun pass through the upper strata of the atmosphere, imparting to them little heat. This the air receives chiefly near the surface. As we ascend, the temperature diminishes one degree for every 300 or 400 ft. Near the equator perpetual snow covers the mountains at the height of 15,207 ft.; in lat. 60° it is found at 3,818 ft., and in 75° at 1,016 ft. The main cause of this is not that the solar rays possess less heat in the higher regions, as the contrary has been proved, but that the portions of the earth's crust projecting far up into the atmosphere, as is the case with high mountains, possess less of the interior heat of the earth, being more subject to cooling by radiation, which has caused their temperature to descend to such a very low degree, that even a midday tropical sun cannot raise it to 32° F. Another physical property of the atmosphere is its refraction and reflection of light. If the sun's rays did not illuminate the mass of the atmosphere, it would be of a black color; but a partial refraction of the most refrangible rays takes place, and this gives the blue color to the sky, while that of the clouds comes from the reflection of the light upon the particles of vapor floating in the atmosphere. This blue color is too faint to be perceived in any small quantity of air; it is only the great depth of the atmosphere that makes it visible, as the color of the ocean is only apparent when the waters are seen in mass. 3. *Chemical properties.* The atmosphere consists chiefly of a mixture of three gases, oxygen, nitrogen, and carbonic acid, with a very variable quantity of watery vapor. The normal quantities are by weight 23·2 per cent. oxygen, 76·7 nitrogen, and about 0·1 carbonic acid, while the watery vapor varies from almost utter absence to saturation or more than 80 per cent., according to locality, climate, season, and other circumstances. To this must be added the fact that the atmospheric oxygen is found in two different conditions according to circumstances, one being the neutral state or ordinary oxygen, the other its active condition, when it is called ozone. This differs from ordinary oxygen, first, by being more condensed so as to be one half heavier, 100 cubic inches of ordinary oxygen weighing 32 grains, while the same bulk of ozone has a weight of 48 grains; secondly, by causing many chemical reactions which ordinary oxygen is incapable of producing. It is also a most powerful disinfectant, one part of ozone purifying 3,000,000 parts of putrid air, by burning up as it were the miasmatic exhalations. In the arts it has already been applied as a bleaching and purifying agent. Its great

chemical activity makes it, when present in large quantity, hurtful to animal life, by its very irritating action on the respiratory organs. A heat of 500° F. reconverts it into ordinary oxygen. Nature produces it continually by the electric discharges during thunderstorms, by the odors of flowering plants under the influence of light, by vegetation in general, and by some kinds of decay. Its formation is chemically explained by the fact that the molecule of oxygen consists of a double atom, while in the molecule of ozone three atoms occupy the same space. (See Ozone.) In unhealthy localities little or no ozone is present, but in the vicinity of large cities ammonia is found, and nitric acid and nitrate of ammonia are generated in thunderstorms by the chemical combination of nitrogen and oxygen induced by the electrical spark. These, which may be regarded as accidental impurities, are soon dissipated in the great bulk of the atmosphere, precipitated upon the earth, washed down by the rain, and decomposed by the ozone. The proportions of the three elements of the air hardly vary, whether this is taken from the summits of the highest mountains, or from extensive plains; nor are they affected by season, climate, or weather. In closely confined places, exposed to putrescent exhalations, the purity of the air is necessarily much affected; the proportion of oxygen diminishes, and mephitic gases, as sulphuretted hydrogen and more carbonic acid, are introduced. Prof. Nicol gives an analysis of air collected in a filthy lane in Paris, in which the oxygen constitutes 13·79 per cent. only, instead of 23 per cent.; nitrogen was present to the amount of 81·24 per cent.; carbonic acid, 2·01; sulphuretted hydrogen, 2·99 per cent. Such air contains also many other vapors, inorganic as well as organic, which formerly escaped detection, but which at present, by the modern refinements in the analysis of gases, may be determined. That the air is a simple mixture and not a chemical compound of its elements, is proved by the fact that water, long exposed to the atmosphere, contains in solution the three gases in quite different proportions from those in the air; such water will ordinarily contain most carbonic acid, oxygen in the next largest proportion, and nitrogen in the least, because nitrogen is much less soluble in water than the other gases. When carbonic acid gas is increased in the air to an amount not exceeding 5 to 6 per cent., it is, according to Berzelius, still probably harmless. Man may even live for a time in an atmosphere containing 30 per cent. of carbonic acid. But if carbonic oxide, which is the product of imperfect combustion of carbon and contains only half the amount of oxygen of the carbonic acid, be present even to the amount of only 1 per cent., it may prove fatal. Carbonic acid is the product of perfect combustion of carbon, and of the breathing of animals. In breathing, the oxygen in part unites with carbon in the system, and the air expired contains 4½ per cent. of carbonic acid gas. This is immediately dispersed through the atmosphere by the property of diffusibility, possessed in such a remarkable degree by the gases; but if confined in close places, it soon accumulates, contaminates the air, and makes it unfit for breathing. Man requires from 212 to 353 cubic feet of pure air per hour, containing 50 cubic feet or about four pounds of oxygen.—Growing plants are the compensating agents, which, besides generating ozone, counteract the noxious influences of combustion and the breathing of animals. Plants as well as animals breathe the air, but the effect of this respiration is just the reverse of that of animals. The carbonic acid gas is decomposed in the laboratory of their leaves, the solid carbon is added to their structure, and the pure oxygen is expired. This action takes place only by the influence of daylight, while in the dark the plants give some of the carbonic acid back to the atmosphere; therefore plants should not be kept in sleeping apartments. Oxygen is thus the life-sustaining element of the air for animals, and carbonic acid for plants, while the chief function of nitrogen appears to be for dilution; but undoubtedly it is also the source of the nitrogen in some plants, and consequently in animals.—Water, in the form of vapor, has already been noticed as one of the constituents of the atmosphere. It manifests its presence by condensing in visible moisture and drops upon cold surfaces. When the air is warm, its capacity of holding water is great; as it becomes cool, this capacity diminishes, and the water that is now in excess appears as dew, or mist, or rain. The atmosphere is said to be dry when it has not so much moisture in it as it is capable of holding at its temperature; evaporation then takes place. But let the temperature fall, and the same air will be damp without the absolute quantity of vapor having changed. The degree of heat at which air is saturated with the water it contains is called the dew point. If it is high, the absolute quantity of vapor in the air is great; if low, there is little vapor in it.

ATMOSPHERIC ENGINE. Under this name was formerly understood an engine operated by the simultaneous pressure of cold air on a small piston and hot air on a large piston, the air being heated and expanded during its passage from the small cylinder into the large one. Since, however, engines have been built to work by the pressure of the air alone, without the addition of heat, engines operated by the latter force have been called caloric engines. (See Caloric Engine.) The use of ordinary atmospheric pressure as a primary source of power has long been a delusion of persons of the class who still seek for perpetual motion. All that has been accomplished in this way has been by making use of the continual changes in the atmospheric pressure, as for instance to move the mercurial column in a syphon barometer of which the two vertical tubes were very far apart, and the whole balanced on a central

pivot. An increase in atmospheric pressure would drive more mercury into the long closed end, and cause this to descend; a decrease in atmospheric pressure would cause the mercury to return to the short open end, and cause this in its turn to descend; while wheelwork was so arranged as to produce motion by a descent either way. Such a contrivance, however, or any other based on the same principle of the changes in atmospheric pressure, even when constructed on the largest practicable scale, can only produce a weak power. It is evident that in order to produce an available motive power by the application of atmospheric pressure, this pressure ought to be made as strong as steam pressure; for which purpose the air must be compressed by mechanical means, or at least a vacuum created. In this way, however, the air can only be employed for the transmission of power, and this is actually the case in all atmospheric engines. None of them are prime movers, but the air which drives them is compressed by another power—either steam, falling water, or animal force. There are several ways of using this compressed air. One is to fill with it a large strong cylinder, the equivalent of a locomotive boiler, and use this compressed air to work the piston, in the same way as steam is used. This is only applicable upon cars traversing short distances, so that the engine can periodically receive new supplies. It is argued that a very large steam engine, creating the power for a great number of small engines, by compressing air in large reservoirs, to supply all the engines of a city line of railroad cars, is very economical in comparison with several scores of small independent motors, each with its furnace and boiler. Another method of supplying atmospheric pressure from one prime motor to different small engines, is to conduct the air in tubes from the former to the latter. This was successfully employed by Sommeiller in the construction of the Mont Cenis tunnel; the hydraulic power of a cataract near the entrance of the tunnel being used as a prime motor to compress the air in reservoirs, whence it was conducted by flexible tubes to the rock-boring machines. This method is now extensively in use in the United States, the prime motor being ordinarily steam power. One of the chief advantages of atmospheric engines of this class is that, in place of heat and steam escaping, as is the case with steam engines, pure atmospheric air escapes, which by its expansion becomes cold, and thus supplies the end of the mining shaft with pure and cool air, securing a most perfect ventilation; while the use of steam in such a locality, even if a provision were made to carry off the escaping steam, would raise the temperature to such a degree as to make further work impossible. It is now acknowledged that the boring of such tunnels as the Mont Cenis, the St. Gothard, and the Hoosac would be impracticable but for drills worked by atmospheric engines. When the boring is performed by percussion of steel drills, the atmospheric pressure moves a piston connected with them. When the boring is performed by rotation, as is the case with the diamond drill, the atmospheric engine may be either a rotary or a reciprocating one. In fact the arrangement of all atmospheric engines is nearly identical with that of non-condensing steam engines. As atmospheric pressure may be easily transmitted through tubes in any direction, and therefore also the power of a prime motor, it is expected that in the course of time the power of large cataracts will be utilized in this way to drive atmospheric engines for several miles around. A piston may also be propelled through a very long tube by atmospheric pressure or by a vacuum; this has been applied to transmitting small packages, and also to the propulsion of railroad trains. (See PNEUMATIC DESPATCH, and PNEUMATIC RAILWAY.)

ATNAHS, or **Atenâs,** an Indian tribe of British America, called also Shoushwap or Chin Indians. They are a Selish tribe on Frazer and Salmon rivers, an energetic, industrious people, manufacturing blankets of good quality from the wool of a native goat or sheep.—Another tribe called Atnas is mentioned in the early accounts of the northwest as living on Copper river, Alaska, and seems to be now included in the Koloshians.

ATOLL, the Malay name of a peculiar form of coralline island common in Polynesia and the Indian ocean, which consists of a circular reef, seldom more than a few hundred yards wide, enclosing a sheet of water connected with the ocean by an open passage. These lagoons are sometimes 30 m. in diameter and from 100 to 400 feet deep, and afford safe harbors, the opening never being on the windward side. The reefs generally support vegetation, and are sometimes inhabited.

ATOMIC THEORY, the doctrine that matter consists of ultimate particles or atoms incapable of division. This idea was first maintained speculatively in opposition to the notion that matter is capable of being divided to infinity. Modern science has adopted this idea, not merely as a speculation which cannot be verified, but as a proposition which interprets and harmonizes a wide range of experimental facts. Inasmuch as it offers an explanation of the facts and principles of chemistry, these require to be noticed before we can understand the use and necessity of the theory. Modern chemistry took its rise with the abandonment of the old notion of phlogiston, and the elucidation of the principles of combustion by Lavoisier. He introduced the balance as a fundamental instrument of chemical inquiry, and thus placed the science upon a firm quantitative basis. As weighing became general and accurate, it was soon discovered that chemical combination is definite, and chemical composition constant. A certain weight of alkali, for example, combines with a given weight of acid

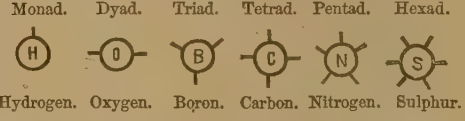
to produce a salt, which therefore has a fixed numerical constitution. A great number of experiments showed that chemical union always takes place in this manner, and thus was established the fundamental law of definite proportions. It was next discovered that combination may take place between the same substances in different proportions, and that when this is the case these proportions have simple numerical relations to each other. Thus, if two elements A and B are capable of uniting in several proportions, they may be represented as A + B, A + 2B, A + 3B, A + 4B, &c. The relations are not always so simple as this, but the principle is general, and is known as the law of multiple proportions. Again, it was found that if two elements which combine with each other combine also with a third, the proportions in the first combination are preserved also in the second. If a body A unites with certain other bodies B, C, D, then the quantities B, C, D, which combine with A, or certain simple multiples of them, represent for the most part the proportions in which they can unite among themselves. This is known as the law of equivalent proportions or chemical equivalence. It having thus been found that chemical actions follow strict numerical methods, and that each body has its fixed measure, it became important to determine exactly what these measures are. This resulted in the scale of combining numbers or equivalents, or, as they are now more commonly termed, atomic weights, which constitute the foundation of the science and are given in all text books.—But if all kinds of matter in their chemical transformations are ruled by these numerical principles, we should expect that other material properties would be affected by them, and such is the fact. The combining weights of those elements which are known to exist in the state of gas or vapor are, with one or two exceptions, proportional to their specific gravities in the same state. Thus, the specific gravity of hydrogen being 1, that of oxygen is 16, sulphur vapor 32, chlorine 35·5, iodine vapor 127; but the figures represent also the combining numbers of these elements. Mr. Watts thus expresses the law of combination by volume: "If the smallest volume of a gaseous element that can enter into combination be called the combining volume of that element, the law of combination may be expressed as follows: The combining volumes of all elementary gases are equal, excepting those of phosphorus and arsenic, which are only half those of the other elements in the gaseous state; and those of mercury and cadmium, which are double those of the other elements." Gay-Lussac showed that combinations by volume take place in definite and multiple proportions, and that the volume of a compound gas always bears a simple ratio to the volumes of its elements, thus:

1 vol.	hydrogen	and	1	chlorine	form	2 vols. hydrochloric acid.
2 vols.	"	"	1	oxygen	"	2 " watery vapor.
3 "	"	"	1	nitrogen	"	2 " ammonia.

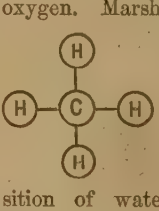
Again, it is found that in many cases two or more compounds which are supposed to contain equal numbers of equivalents of their respective elements crystallize in the same or in very similar forms, and such compounds are said to be isomorphous. Accordingly, these isomorphous relations are often appealed to for the purpose of fixing the constitution of compounds, and thence deducing the atomic weights of their elements, in cases which would otherwise be doubtful. It has also been established that substances having different properties may have the same relative proportion of constituents, and such are said to be isomeric. Moreover, something analogous to this is seen among the elements themselves: they are capable of assuming different states, which capability is called allotropism. In both cases we are compelled to assume that their constituent parts are subject to differences of arrangement. Combining quantities are also intimately related to heat. This relation is thus stated by Mr. Watts: "The atomic weights of the elements, determined according to their modes of combination, are for the most part inversely proportional to their specific heats; so that the product of the specific heat into the atomic weight is a constant quantity. The same quantity of heat is required to produce a given change of temperature in 7 grains of lithium, 56 of iron, 207 of lead, 108 of silver, 196·7 of gold." Finally, the law of combining proportions is implicated with the electrical relations of matter. Prof. Faraday proved that an equivalent of an element consumed in a battery gives rise to a definite quantity of electricity, which will produce exactly an equivalent of chemical decomposition. For example, the consumption of 32 grains of zinc in a battery excites a current which will set free from combination 1 grain of hydrogen, 108 of silver, and 39 of potassium; these being the combining numbers of the respective elements.—The facts above stated are independent of all hypothesis, and are the results of pure experiment. They demonstrate that in its ultimate and minutest form matter is in some way numerically constituted. How it is constituted was a question which the human mind could not escape. It was necessary to frame some clear conception of its ultimate constitution that would connect and interpret the known facts. This was done by Dr. John Dalton of Manchester, England, in constructing the atomic theory. He was aware of the law of definite proportions, and he discovered the law of multiple proportions by investigation of the compounds of carbon and hydrogen, of oxygen and carbon, and of nitrogen and oxygen. To account for these laws, he assumed, first, that all matter consists of indivisible, unchangeable atoms of extreme minuteness; second, that all the atoms of the same element have the same weight, but that in different elements they have different weights; third, that these relative weights correspond with the combining numbers,

which may therefore be called atomic weights; fourth, that these different atoms have mutual attractions and combine to form chemical compounds, not by interpenetration of their substance, but by atomic juxtaposition. If this idea be admitted, the principles of chemical constancy and definite proportions follow as inevitable consequences. The definite proportions in which bodies combine represent the constant ratio between the weights of the combining atoms. The principle of multiple proportions is equally explained, for the successive additions must be made by whole atoms, and therefore by whole numbers. One atom of carbon unites with one atom of oxygen to form carbon monoxide, and with two atoms of oxygen to form carbon dioxide. That the atomic weights of compounds must equal the sum of the atomic weights of their elements follows with equal certainty. Moreover, in the rearrangement of atoms in a body, without addition or subtraction of elements, we have a ready explanation of isomeric and allotropic changes. The relations of chemical changes to heat, now expressed by the phrase "atomic heat," and their relation to volume, indicated by the phrase "atomic volume," become in like manner capable of explanation on the assumptions of the atomic theory. It is a merit and a test of this theory that its resources have kept pace with the rapid extension of the science, but it has required to be itself developed for this purpose. In the hands of Dalton it was applied to a few simple fundamental facts; it now embraces facts of many orders and of greater complication. At present the conception of the molecule or the group of combined atoms plays a much more important part than it did at first. Even the atoms of the elements (as will be presently explained) are now conceived not to exist separately, or as units, but as combined with each other in a molecular condition. An atom is defined as the smallest particle of simple matter that can enter into the composition of a molecule. A molecule is defined as a group of atoms held together by chemical force, and is the smallest particle of any substance that can exist in a free or uncombined state in nature. Molecules are of two kinds: elemental molecules, in which the atoms are alike, and compound molecules, in which the atoms are unlike. Molecular structure, the outgrowth of the conception of atoms, is now the fundamental idea by which chemistry and physics are connected.—The doctrine of Dalton at first seemed to afford an easy explanation of chemical equivalents, by which one body may replace another, or be substituted for it by simple exchange of atoms. But recent discoveries have shown that it fails here and requires extension. It was formerly supposed that when one element replaces another in a combination, the substitution always takes place atom for atom, and hence the terms atom and equivalent were regarded as synonymous. But it is now known that this is only true for certain elements, which are accordingly classed as monogenic elements. There are others which always take the place of two or more atoms of a monogenic element, and these are termed polygenic elements. This brings us to the new conception of atomicity, which has now become the fundamental idea of the science. To understand it properly, it will be necessary to glance at the steps of chemical theory by which it has been reached. The name of Lavoisier is intimately associated with the first general theory of chemical combination. This was the binary or dual system of chemistry. An acid was held to result from the union of a simple body (generally non-metallic) with oxygen; an oxide resulted from the combination of oxygen with a metal; a salt was produced by the union of an acid with an oxide, and this pairing of doubles represents its constitution. In all combinations affinity is assumed to be exerted upon two elements, simple or compound, which attract one another and unite by virtue of opposite properties, all chemical compounds being therefore binary. This is dualism, and the chemical nomenclature was constructed upon the idea. The view proposed by Lavoisier was ably enforced by Berzelius. Electro-chemistry, by which bodies were decomposed into pairs that appeared at opposite poles of the battery, lent powerful aid to the binary theory; and Berzelius carried it out by arranging the elements on a scale of antithesis as electro-positive and electro-negative. In 1816 he also devised a new notation, now in general use, by which letters symbolize the elements, and composition can be compendiously represented to the eye by means of formulas. Prof. Wurtz, in his "History of Chemical Theory," says: "By the arrangement of these formulas in which the acid appeared on one side with the train of oxygen atoms belonging to it, and the metallic base on the other with the oxygen united to the metal, Berzelius gave to the dualistic system a degree of precision unknown before his time." But a true scientific theory must embrace all orders of facts to which it is applicable. Dualism was well fortified in mineral chemistry, but it was not easy to bring the complexities of organic chemistry into harmony with it. Berzelius, however, made this his great task. There were organic acids, organic bases, and organic salts; and these were represented on the binary plan. Organic radicals were also discovered —compounds which played the part of simple elements; and these were subordinated to the binary system. By this theory of compound radicals dualism was extended to organic chemistry, and chemical theory was apparently unified. Yet the victory was far from complete. The deeper study of organic compounds led eminent chemists to question the validity of the dual hypothesis as applied to them. A school arose led by Dumas, Laurent, and Gerhardt, which took a new view of the constitu-

tion of organic bodies. Its first idea was the doctrine of substitutions, and in its application a breach was made at the outset in the electro-chemical theory. It was found that chlorine, a powerful electro-negative element, could replace hydrogen, a strong electro-positive element, in an organic compound, playing the same part and not altering the character of the compound. The new view, rejecting dualism, regarded organic bodies as units, or as unitary structures; and their changes by substitution were likened to the alteration of an edifice by successively removing its individual bricks and stones and replacing them by others. Laurent compared organic compounds to crystals, whose angles and edges may be replaced by new atoms or groups of atoms, while the typical form is preserved. Thus to the dualistic point of view was opposed the unitary system; to the idea of combination resulting from addition of elements was opposed that of compounds formed by substitution of elements. An acid is changed to a salt by substituting a metal for its hydrogen, without destroying its molecular structure. A salt is no longer to be regarded as a binary compound, containing an acid on the one side and an oxide on the other; it is a whole, a single group of atoms, among which are one or more atoms of metal capable of being exchanged for other metallic atoms or for hydrogen. This view led to the theory of chemical types, in which certain substances are taken as patterns of molecular structure with which analogous bodies are classified. Thus we have the water type, the hydrogen type, and the ammonia type, under which bodies are grouped with no reference to their former relationships. The binary theory here disappears, and substances are brought together not so much on the principle of composition or atomic arrangement, as by analogies of reaction and decomposition.—But the doctrine of types was transitional, and soon developed into the completer theory of atomicity, by which is meant combining capacity. For example, there are some acids which require for saturation only one equivalent of a certain base; there are others which require two equivalents of the same base to saturate them; and others still which demand three. Now these acids are clearly not equivalents of each other, their capacities of combination varying as 1, 2, 3; and they are therefore said to have different atomicities. This conception of the varying combining powers of bodies, as a controlling chemical principle, was worked out in the field of organic chemistry; but it is now extended to the inorganic elements, and offers a new system of classification and a new chemical method.—In the new chemistry the elements are arranged into six groups, although some add a seventh. These are named monads, dyads, triads, tetrads, pentads, and hexads—terms expressive of their several combining capacities. Monads, of which hydrogen, chlorine, and potassium are examples, are monogenic, that is, they can combine only with single atoms. All the rest are polygenic, that is, they can combine with 2, 3, 4, 5, or 6 monogenic elements or their equivalents. Molecules are also designated as monatomic, diatomic, triatomic, tetratomic, pentatomic, and hexatomic. For equivalence, which represented the old idea, the term valence is coming into use; and a series of words is derived from it describing the groups as univalent, bivalent, trivalent, quadrivalent, quinquivalent, and sexivalent, while the atomicities above univalence are termed multivalent. The varying equivalence, valence, or combining power of atoms is represented in several ways by which the idea is made clear. The graphic symbol of an atom is a circle with lines radiating from it, called bonds, which indicate the valence or atomicity. They are represented as follows, the first line giving their names, the second their symbols, and the third examples:

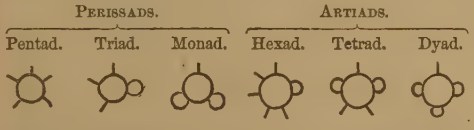


Water, OH_2, would be thus represented by graphic formula: . Hydrogen has as it were but a single pole of attraction, represented by a single bond, while oxygen has two poles and two bonds. The attractions of the two atoms of monatomic hydrogen are satisfied by the two attractions of diatomic oxygen. So carbon-dioxide, CO_2, may be represented thus: . Here the four attractions of tetratomic carbon are saturated by those of the two atoms of diatomic oxygen. Marsh gas, CH_4, is thus represented:



The circle may be omitted, and the bonds connected directly with the letters, thus, —H, —O—, , it being immaterial how the bonds are arranged. The composition of water will then be represented thus, H—O—H, and carbon-dioxide O=C=O. The atomicity is often represented as follows by dashes: H′, O″, B‴, C⁗, N⁗′, S⁗″; or again thus by Roman numerals: H^{I}, O^{II}, B^{III}, C^{IV}, N^{V}, S^{VI}. In chemical changes and the formation of new compounds all attractions require to be satisfied—every bond engaged. This fact fixes a limit to combination, for certain groupings become impossible. One atom of a monad cannot unite with one atom of a dyad, because one attraction cannot neutralize two. It takes two atoms of a monad to form a compound with an atom of a dyad; four atoms of a monad or two atoms of a dyad are required to saturate a tetrad; but in each case all the polarities have to be provided for.

There are seeming exceptions to this law. Two atoms of a monad element, as potassium, may unite with one, two, three, four, or five atoms of a polyad element, as sulphur. By an examination of the graphic formulas of these compounds, K—S—K, K—S—S—K, K—S—S—S—K, &c., it is seen that any number of atoms of a polyad element may unite with two atoms of a monad, provided they be interposed between the latter. When thus placed, they are said to perform a linking function in the compound. The atomicity of an element is its highest equivalence, and the compound form is then said to be normal or saturated. Yet the equivalence of atoms is not always the same; an atom may form several compounds of the same substance. Elements of even equivalence, in which the atomic poles are in pairs, are called artiads; those of uneven equivalence, in which the poles are odd, are termed perissads. Prof. Barker states that the equivalence "always increases or diminishes by two; so that an atom of the same element may in different compounds have an equivalence of 1, 3, 5, or 7, or of 2, 4, or 6. A perissad atom can never become an artiad atom by such a change, nor can an artiad become a perissad." This variation of atomic equivalence is accounted for on the hypothesis that the bonds of an atom are capable of saturating each other in pairs. A pentad may thus become a triad and a monad successively, and a hexad may be converted into a tetrad or into a dyad, as follows:



It follows from this view that only the atoms of those free elements can be considered as existing separately in which the number of bonds is even. The others can only exist in combination with each other, forming polyatomic molecules. Free hydrogen cannot be —H, because its bond is unsatisfied; it must therefore be H—H, that is, united with itself, forming what we might call hydride of hydrogen. Chlorine is not Cl—, but Cl—Cl, and free oxygen is not —O—, but O=O. Compounds are formed by replacement, and chemical science thus becomes rooted in atomic capacity.—While therefore in the last quarter of a century chemical philosophy has undergone a total revolution, the atomic theory has not only been maintained and strengthened, but it is doubtful if the advance could have been made without its assistance.

ATRATO, a river of Colombia, South America, rises near lat. 5° 20′ N. and lon. 76° 50′ W., and flows nearly due N. for about 250 m. to the gulf of Darien. The bar at its mouth being crossed, it has a wide channel not less than 35 ft. deep for the first 96 m., with a fall not exceeding 2½ inches to the mile; and for 42 m. further a channel exceeding 18 ft. in depth can be cleared; while the distance across to the Pacific ocean, from which the river is separated by one of the lowest ranges of the Andes, does not exceed 50 m., and western branches of the Atrato are said to almost meet rivers from the Pacific having their source in this dividing ridge. Examinations have been made with the view of determining the practicability of constructing a ship canal by this river, to connect the Caribbean sea with the Pacific. The latest was by the United States government in 1871. The route which promised the least difficulty between the middle branch of the Atrato and the Jurador, emptying into the Pacific, would require 48 m. of canal; the height of the watershed, which must be excavated or tunnelled, being more than 500 ft.—The Atrato for nearly its whole length runs through a low swampy region, which is entirely overflowed by freshets. Quibdo, on its upper course, is the only town of any consequence on the river. It is a miserable place of 1,500 inhabitants, mostly blacks, with some Indians and a few whites. It is situated on several isolated hillocks of gravel and clay, in the midst of the swampy region which extends all around. The temperature of the region is close and sultry, and the rainy season continues all the year. Gold is found in fine dust in the bed and banks of the Atrato, at and above Quibdo, and also of the different branches of the river. Some portions of the country are described as highly auriferous. Above Quibdo the Atrato receives several branches, of which the Quito is the most important. Were it not for the incessant fluctuations of this stream, which within a few hours frequently reduce it from its ordinary ample channel depth of 7 ft. or more to 5 or 6 ft. or even less, the Quito would present with the Atrato an uninterrupted steamboat thoroughfare of no less than 252 m. from the gulf of Darien. The Quito is wholly in the gold region, and its branches appear to lie in the richest portion of it. The caoutchouc tree abounds.

ATREBATES, or **Atrebatii,** a people of Belgic Gaul, whose name appears in the modern Artois. They joined a confederation against Cæsar, and furnished a contingent of 15,000 troops. A colony of them settled in Britain, in the modern Berkshire and Wiltshire.

ATREUS, a legendary hero of Greece, son of Pelops and Hippodamia. On the death of his son Plisthenes, Atreus married his widow Aërope, who was or became the mother of Agamemnon and Menelaus, commonly known as the Atridæ. She was seduced by Thyestes, the brother of Atreus, and the latter slew the twin offspring of this adultery and served them at a banquet to the seducer. Atreus afterward married his brother's daughter Pelopia, who was already pregnant with Ægisthus by her own father. The child was exposed, but miraculously preserved, and the mother committed suicide. The crimes and misfortunes of the family, springing from the

murder of Mercury's son Myrtilus by Pelops, afforded endless themes for the classic poets.

ATRIUM. **I.** In Roman architecture, the central room of the house, also called *cavum ædium*. In this room the family lived and ate, and here stood the *lares* and *penates*. The room was uncovered in the centre, toward which the roof sloped, to throw the rain water into a cistern in the floor, around which stood the household deities. **II.** The forecourt of a temple. The atrium of the temple of Liberty is most frequently mentioned. **III.** In ecclesiastical architecture, an open space before a church, making part of the narthex, or antetemple. Penitents and others stood in the atrium to solicit the prayers of the pious.

ATROPATENE. See AZERBIJAN.

ATROPHY (Gr. *ἀτροφία*, hunger, from *ἀ* privative and *τροφή*, nourishment), in medicine, the wasting away of any organ or portion of the body from want of nutrition in the part, irrespective of the general nutrition of the body. The principle of vitality decreases in the organ when its functions are suspended, and nutrition slackens where the vital principle becomes inert. The mammary glands or milk-secreting organs, in the breasts of women who have passed the age of child-bearing, are sometimes so much atrophied that traces of them only can be found imbedded in large lobes of adipose tissue or fat. In contrast with atrophy is hypertrophy, or excessive nutrition and enlargement of an organ or set of organs in the body. Any limb or portion of a limb artificially compressed for a long time will be depressed in its vitality, and lack the power to appropriate nutrition from the blood; it will gradually diminish in size and force, and become atrophied. Disuse alone, without compression, will cause atrophy in the upper or the lower limbs, or even in the whole body; for many persons waste away from morbid inactivity, which brings on by degrees emaciation and debility, resulting in decay of the whole system. —Paralysis, by preventing natural exercise in the limbs, may depress the vitality of the parts, and diminish their powers of nutrition. This will cause atrophy, or a falling away of the paralyzed limb. The dislocation of a joint, if neglected, may, by causing pressure on the nerves, cut off a portion of the innervation necessary to maintain the active functions of nutrition in the parts below, and thus depress vitality and bring on atrophy. In children of a scrofulous diathesis, disease in the hip joint often affects the nerves of the parts and the vitality of the whole limb, diminishing the powers of nutrition, and causing the leg to dwindle in comparison with the one which is not affected. In these cases the atrophy is of a double nature; for the gluteal muscles waste away, and the bones decay in part, before the limb begins to dwindle in its general proportions from the weakened powers of nutrition.

ATROPIA, or **Atropine** (Gr. Ἄτροπος, one of the Fates), a vegetable alkaloid of highly poisonous properties, extracted from the *atropa belladonna*, or deadly nightshade. It is obtained from the juice expressed from all parts of the plant, but more particularly from the leaves. It crystallizes in white silky prisms, which have a bitter taste, but no smell. They possess an alkaline reaction, reddening litmus paper; they melt at 194° F., and are volatilized at 284°. Their composition is: carbon, 70·98; oxygen, 16·36; hydrogen, 7·83; and nitrogen, 4·83. Atropia forms crystallizable salts with acids, the sulphate being considerably used in medicine. When in solution it gives a lemon-yellow precipitate with terchloride of gold. It was first obtained by Mein, a German apothecary, by digesting the roots, powdered extremely fine, for several days in alcohol, and afterward separating the other ingredients by various precipitations. From 12 ounces of the root he obtained 20 grains of pure alkali. Chloroform and potassa are also used for obtaining its solution. (See BELLADONNA.)

ATROPOS, one of the Fates (*Mœræ*, Lat. *Parcæ*) of Greek mythology, who cut the thread of life. She is represented with a pair of scales, or a sun dial, or a cutting instrument.

ATTACHMENT (Fr. *attacher*, to seize), in law, the seizure of the person or property. The writ of attachment is of two kinds: 1. Against the person, in the nature of a criminal proceeding for contempt of court. It may be issued against attorneys, solicitors, sheriffs, and other officers of court, for any misconduct or neglect of duty. The object of the attachment is in such cases to bring the offending party personally into court, to answer for the alleged contempt, and unless he can clear himself he is punishable by fine or imprisonment. Jurisdiction has formerly been exercised by courts over a very large class of cases, and no precise limit has been fixed to the power. The statute of New York continues the jurisdiction to the same extent that has been heretofore used. In the famous case of Yates in New York, in 1810, who was committed to prison by the chancellor for misconduct as a master, the question was agitated but not definitively settled whether there was any relief upon habeas corpus from such imprisonment. (People *v.* Yates, 4 Johnson's Rep. 317, 6 id. 337.) 2. A writ as to contempt to enforce the civil remedies of parties to suits, or to protect the rights of such parties. In the English chancery this was the only process for enforcing its orders and decrees. In this country it has been resorted to by all the courts to enforce interlocutory orders. It is, however, no longer used in New York for the collection of costs or any money demand, except against attorneys, solicitors, and other officers of court. (Act of 1847.)—Attachment against property was an old mode of proceeding in English practice to compel the appearance of a defendant in an action. To this head belongs also the proceeding known as foreign attachment, a process under which the prop-

erty of a foreign or absent debtor is seized. The proceeding had its origin in a custom of the city of London, of which we find some notice in the books as early as the reign of Edward IV. By this custom, an action having been brought in the mayor's court against A, and the writ having been returned *nihil* (that is to say, that nothing could be found as a distress to compel appearance of defendant), and thereupon it being suggested by the plaintiff that another person residing in London is indebted to A, a writ is issued to warn such debtor, who is thereafter in the proceedings called "garnishee;" and if he does not deny that he is indebted, the debt is by virtue of such writ attached in his hands to answer the judgment which shall be recovered against A. Cowell defines a foreign attachment to be "an attachment of foreign goods found within a liberty or city in the hands of a third person for the satisfaction of some citizen to whom the said foreigner oweth money." But there is no trace of such proceeding in any other place in England than London. This proceeding has been introduced into our eastern states and some others, and is a common mode of collecting a debt due by a non-resident who has property within the state, such property, whether lands, chattels, or debts due to him, being seized at the commencement of the action to satisfy the judgment which shall be recovered. It is sometimes called trustee process, the person who is indebted or holds property of the non-resident defendant being designated as trustee. In New York an attachment may by the code issue against the property of a non-resident defendant who cannot be served with process, but the proceeding is more simple than the trustee process of the eastern states. There is also a distinct proceeding for the attachment of property of absconding, concealed, absent, or non-resident debtors, which is not an action but a sort of insolvent proceeding for the benefit of all the creditors of the person whose property is attached.

ATTAINDER (Fr. *teindre*, Lat. *tingere*, to stain), in old English law, the extinction of civil rights, and the forfeiture of estate which followed, when a person was condemned to death for treason or felony, or where judgment of outlawry had been pronounced against him for not appearing to answer to a capital crime. It might also take place by act of parliament, called bill of attainder. In the case of high treason the effect was forfeiture of real and personal estate, and corruption of blood, so as to interrupt hereditary descent of any civil right. For capital crimes less than high treason, there was a forfeiture of personal property absolutely, and of the profits of freehold estates during life; and after the death of the criminal all his lands in fee went to the crown for a year and a day. The corruption of blood caused also an escheat of lands. But in its operation escheat was subordinate to forfeiture. In high treason the forfeiture intervened to defeat the escheat altogether, and in the lesser offences it interrupted it for the sovereign's year and day. But the escheat did not take place merely in respect to the lands held by the offender. Thus if a father was seized in fee, and his son committed treason and was attainted, and then the father died, the father's lands even in that case escheated, because at his death the son was incapable of inheriting them, and the son's heirs could not take them because they could only deduce their title through the son. But there was no forfeiture in such a case, because the criminal never had the lands. This corruption of blood and its consequences could not be remedied save by act of parliament. By statute 7 Anne, ch. 21 (the operation of which was suspended at first during the life of the pretender, and afterward during the lives of his sons, but which suspension was repealed by 39 George III., ch. 93), it was enacted that no attainder for treason should extend to the disinheriting of any heir, or to the prejudice of any person other than the traitor himself. By the statute 54 George III., ch. 145, it was provided that no attainder for a felony, except treason or murder, should extend to the disinheriting of any person, nor to the prejudice of the right or title of any person other than the offender himself, during his natural life only; and any person who might otherwise inherit, might on his death claim his land. There have been several subsequent enactments of a similar tendency.—A bill of attainder was a legislative conviction for alleged crimes with judgment of death. The great act of attainder passed in 1688 by the parliament of James II., by which more than 2,000 persons were attainted and their property confiscated, is one of the most noteworthy illustrations of this sort of legislative convictions. Other acts of the same character were those relating to the earl of Strafford in 1641, to Sir John Fenwick in 1696, to Lord Clarendon in 1699, and to Bishop Atterbury in 1723. The so-called bills of pains and penalties were of the same character, though of a milder form, inflicting punishment less than that of death.—Not only probably on account of the mere injustice of all legislative acts of this character, but as well in the fear that the power to inflict such punishments intrusted to the legislature of a democratic state might lead to unusual excesses and abuse in times of political excitement, the founders of our government by a distinct constitutional provision prohibited the enactment of any such laws here. The constitution of the United States declares that no bill of attainder shall be passed either by congress or by any state. But as it still remained competent for the judiciary to convict of treason or to declare attainders, the constitution, still further to guard against this odious form of enactments, also provided (art. 3, sec. 3) that congress should have power to declare the punishment of treason, but that no attainder of treason should work complete corruption of blood or forfeiture ex-

cept during the life of the person attainted. In the cases familiarly known as the test oath cases, Cummings *v.* Missouri, and ex parte Garland, reported in 4th Wallace, U. S. Supreme Court Reports, pp. 277 to 399, where all these constitutional provisions were very fully discussed, it was held by the court that within the meaning of the constitution bills of pains and penalties are included in the prohibition of bills of attainder. The former case involved the oath of loyalty prescribed by the constitution of Missouri adopted in 1865. Under the several sections of the second article of that instrument priests and clergymen (and the plaintiff fell within this description) were required, in order that they might continue to exercise their functions as such, to take this oath of loyalty, which was to the effect that they had not committed certain designated acts of disloyalty to the United States, some of them being at the time of their commission offences involving penalties, and others innocent in themselves; and it was held that these provisions constituted a bill of attainder within the meaning of the federal constitution. The case of Garland involved an act of congress of Jan. 24, 1865, which provided that after its passage no person should be admitted as a counsellor to the bar of the supreme court, and after March 4, 1865, to the bar of any circuit or district court of the United States, unless he should first have taken the oath required by the act of July 2, 1862. This oath was much like that in Cummings's case, and was to the effect generally that the affiant had never been guilty of any disloyalty to the United States; and it was held that exclusion from the practice of the law in the federal courts for past misconduct was punishment for such conduct; that the exaction of the oath was the means provided for ascertaining the persons on whom the act was intended to operate; and that for these reasons the act partook of the nature of a bill of pains and penalties, and was within the constitutional inhibition of bills of attainder. The court in both these cases consisted of nine judges, and in each four of the judges, including the chief justice, dissented; and the prevailing opinion of the court has not commanded the concurrence of some of our ablest jurists.

ATTAKAPAS, a large and fertile section of southwestern Louisiana, including several parishes. Though often mentioned in commercial reports, it is not the legal appellation of any subdivision of the state. Great quantities of sugar and molasses are produced in the district and shipped at Franklin, St. Mary's parish.

ATTAKAPAS, an Indian tribe of southern Louisiana, who have left that name to a district of the state. Their real name is not known; they were called Attakapas or Men-Eaters by the Choctaws. They were first made known to the French by the adventures of Belleisle, who was left on shore by a ship, and was long in their hands. They aided the French against the Natchez and Chickasaws. In 1803 there were about 100 dispersed through the Attakapas district, chiefly on Bayou Vermilion; but in less than 20 years after that they ceased to be enumerated at all. Their language was peculiar, abounding in harsh monosyllables.

ATTALA, a central county of Mississippi, bounded W. by Big Black river; area, 750 sq. m.; pop. in 1870, 14,776, of whom 5,948 were colored. Its surface is undulating, and the soil in some parts fertile. In 1870 the county produced 9,544 bushels of wheat, 337,402 of Indian corn, 35,150 of sweet potatoes, and 8,912 bales of cotton. Capital, Kosciusko.

ATTALUS. I. A general of Philip of Macedon, and uncle of Cleopatra, whom Philip married, killed about 336 B. C. At the wedding festivities of his niece, he called upon the company in the presence of Philip and Alexander to beg of the gods a legitimate successor to the throne. This Alexander violently resented, and a brawl ensued, in which Philip took the part of his general and drew his sword upon his son. Alexander and his mother Olympias then withdrew from the kingdom. The assassination of Philip by Pausanias was the consequence of an outrage committed by Attalus which Philip refused to punish. Attalus, who was then in Asia, entered into a conspiracy against Alexander, but soon made overtures for submission, which the king disregarded. Hecatæus was sent into Asia with orders either to bring Attalus to Macedonia or assassinate him, and the latter course was adopted. **II. Attalus I.,** king of Pergamus, reigned from 241 to 197 B. C. He was the first ruler of Pergamus who bore the title of king, assuming that dignity after a victory over the Gauls. He made himself master of a large portion of Asia Minor, but was driven back to Pergamus by Seleucus Ceraunus and Achæus. He was afterward an ally of Antiochus the Great against Achæus, and of the Romans and Rhodians against Philip of Macedon. The Macedonians invaded his territory, but failed to capture Pergamus. **III. Attalus II.,** king of Pergamus, surnamed Philadelphus, second son of the preceding, born in 200 B. C., succeeded his brother Eumenes II. in 159, died in 138. He adhered to the Roman alliance, founded Philadelphia in Lydia, and encouraged the arts and sciences. **IV. Attalus III.,** king of Pergamus, surnamed Philometor, son of Eumenes II. and Stratonice, succeeded his uncle Attalus II. in 138 B. C., died in 133. On his accession he murdered many of his relatives and friends. After a short reign of disorder he was seized with remorse and melancholy, withdrew from public affairs, and devoted himself to sculpture and gardening. He bequeathed his kingdom to the Romans. **V. Flavius Priscus Attalus,** emperor of the West in 409–'10. He was born in Ionia, brought up as a pagan, and baptized by an Arian bishop. Being a senator and prefect of Rome at the time of the second siege of the city by Alaric, he was declared emperor by the barbarians in place of Honorius, and sent a message

to Honorius, commanding him to cut off his hands and feet and retire to a desert island. At the end of a year he was deposed by Alaric on the plain of Ariminum. After the death of Alaric he was again put forward by Ataulphus as a claimant of the purple; but he was taken prisoner and sentenced by Honorius to lose a thumb and forefinger and suffer banishment in the island of Lipari.

ATTAMAN, the title of the supreme chief of the Cossacks, now retained only by those of the Don. The attaman was elected by the people in a general public meeting; the mode of election was by throwing their fur caps at the favorite, and he who had the largest heap of caps was chosen. When in the 16th century the Cossacks submitted to the Poles, the election of the attaman was confirmed by the Polish king. After the secession of the Cossacks from Poland and their submission to Russia in the 17th century, the attamans preserved the same rights until after the insurrection of Mazeppa, when the office was suppressed. In 1750 it was restored in the person of Count Razumovsky. When Catharine II. destroyed the organization of the Cossacks of the Ukraine, the dignity of attaman was confined to those of the Don. The last elective attaman of these Cossacks was Platoff, after whose death the emperor Nicholas made the dignity of attaman hereditary in the cesarevitch. The commanders of various other Cossack organizations in Russia bear the title of attaman, but only by custom and courtesy. From the word attaman was derived the word *hetman*, in ancient Poland the title of the commander of all the military forces of the nation.

ATTAR or **Otto of Roses,** a delicious perfume extracted from the petals of the rose. It is a volatile oil, of soft consistency, nearly colorless, and deposits a crystallizable substance partially soluble in alcohol. The best is prepared at Ghazipoor in Hindostan; but it is apt to be much adulterated with sandalwood and other oils. It is obtained from rose water by setting it out during the night in large open vessels, and early in the morning skimming off the essential oil, which floats at the top. It is estimated that 200,000 well grown roses are required to produce half an ounce of the oil; and the value of this when it is manufactured is about $40. If warranted genuine at the English warehouses, it sells for about $50, or $100 per ounce.

ATTERBOM, Peter Daniel Amadeus, a Swedish poet, born Jan. 19, 1790, died in Upsal, July 21, 1855. At the university of Upsal he was one of several students who formed the "Aurora" association, with the purpose of emancipating Swedish literature from French influence. His essays published in the society's magazine, the "Phosphorus," and directed against the academy and the prominent literary party of the day, provoked a feud in which he was the chief object of attack. But he gradually gained adherents, and in 1819, after a tour of two years in Germany and Italy, he was made German tutor to Prince Oscar, the future king of Sweden. Subsequently he became professor at Upsal, and in 1839 was received as member of the academy, which he had assailed in the "Phosphorus." The best of his satirical contributions to that magazine was a drama in prose entitled *Rimarbandet*, "League of the Rhymers." As founder and for many years editor of the *Poetisk Kalender*, he exerted a marked influence upon æsthetic culture in Sweden. His lyrical poems are contained in his *Samlade Dikter* (2 vols., Upsal, 1836–'7). His *Skrifter* or confessions (1835) treat of history and philosophy. The most important of his other works, *Svenska Siare och Skalder* ("The Seers and Poets of Sweden"), is a review of Swedish literature. The 6th and last volume of this work appeared in 1856. A posthumous work, *Poesiens Historia*, was published at Örebro in 1862. The best complete edition of his works appeared there in 1858.

ATTERBURY, Francis, an English theologian and politician, born at Milton, near Newport-Pagnell, Buckinghamshire, March 6, 1662, died in Paris, Feb. 15, 1732. He was the son of a clergyman, and was educated at Westminster school, and at Christ Church college, Oxford, where he took his bachelor's degree in 1684. In 1687 appeared his controversial work, "A Reply to 'Considerations on the Spirit of Martin Luther and the Original of the Reformation,'" a pamphlet written by Obadiah Walker, a Roman Catholic, master of University college. Atterbury's defence of Protestantism was long classed among the best of such arguments. He now acted for several years as tutor to young Boyle, afterward earl of Orrery. Taking orders in 1691, his eloquence as a preacher procured him several offices in the church, and finally the appointment of chaplain to the king and queen. He was constantly involved in controversies on theological and literary subjects. He acquired special notoriety from a work written principally by him, but published in 1698 under the name of Charles Boyle, who was then a student at Christ Church, in which great wit but little learning was used in a violent attack upon Richard Bentley, who had declared the reputed letters of Phalaris, previously published by Boyle, to be entirely spurious. This was one of the most famous literary controversies of the time, and before it closed it had enlisted much of the talent of the two universities on one side or the other. In 1700 Atterbury engaged on the side of the clergy in a discussion of the rights of convocation, and received the thanks of the lower house of convocation, and the degree of D. D. from Oxford. In 1702 he was appointed a chaplain in ordinary to Queen Anne, in 1704 dean of Carlisle, and in 1707 canon in Exeter cathedral. During several years he engaged in an intricate theological dispute with Benjamin Hoadley. In 1710 he was made prolocutor to the lower house of convocation, in 1712 dean of Christ Church

(but removed on account of his quarrelsome temper), and in 1713, on the recommendation of Lord Oxford, bishop of Rochester. It has been asserted, though never proved, that on the death of Queen Anne Atterbury proposed an immediate attempt in favor of the pretender, James; at all events he soon showed himself on the side of the Stuarts, and vigorously opposed the measures of the government. He was finally convicted of participation in a treasonable plot for the forcible restoration of the fallen dynasty, and after making an eloquent defence before the lords, he was sentenced in May, 1723, to expulsion from all his offices and to perpetual exile. In June he left England for France, with his daughter Mrs. Morrice, and resided in Paris during the remainder of his life. For several years of his exile he continued to work secretly in the interest of James; but he lost favor with that prince on account of certain differences of opinion, and, though afterward reconciled to him, he was never his active partisan after 1727, when he wrote to him a letter of withdrawal. He was buried in Westminster abbey, though without public ceremony; and the government afterward caused his coffin to be opened, in search for treasonable papers supposed to be hidden in it.

ATTICA (Gr. Ἀττική, probably a corruption of Ἀκτική, from ἀκτή, shore or coast), one of the political divisions of ancient Greece, occupying a triangular peninsula, bounded N. by Bœotia, E. by the Ægean sea, S. W. and W. by the Saronic gulf and Megaris; area, about 840 sq. m. It is intersected by several mountain ranges, having their centre and highest point in the great group called by the ancient Greeks Cithæron (the modern Elatea, the mountain of firs), which rises at the N. W. extremity of the country, and a little E. of the Corinthian gulf, to the height of 4,630 feet. From this extend to the eastward the Parnes mountains, forming part of the boundary and an almost impassable barrier between Attica and Bœotia; and to the southward several smaller ranges, the westernmost separating Attica from Megaris, while the others divide the country into districts anciently known by the following names (mentioned in their order from west to east): the Eleusinian plain, N. E. of the bay of Eleusis; the Athenian plain, having its centre near Athens; the Mesogæa or midland district, an undulating plain, enclosed by Mt. Hymettus, Mt. Pentelicus, the sea, and a range of hills running across Attica from the promontory of Zoster; the Paralia or coast district, including all the southern part of the peninsula, below the promontory of Zoster on the W. and Brauron on the E.; and finally, the Diacria or highlands, bounded by the Parnes range, Pentelicus, and the sea, in which district lies the plain of Marathon. The rivers of Attica are insignificant, and in summer nearly dry. The Cephissus and Ilissus, the two watering the Athenian plain, are those most frequently mentioned in history. The soil is light; in ancient times it appears, by careful culture, to have produced a large amount of grain, and figs and olives, the excellence of which was famous in Greece; but in modern days agriculture is neglected, and the products are inconsiderable.—The ancient inhabitants of Attica belonged to the Ionic race; of their origin even tradition conveys no information. They claimed that their ancestors had sprung directly from the soil of the country. At the beginning of authentic Attic chronology, placed by Grote at the archonship of Creon, 683 B. C., they were divided into four tribes or classes (φυλαί), Geleontes, Hopletes, Ægikores, and Argades. The origin of these is uncertain, some traditions attributing the quadruple division to Cecrops, others to Pandion, and one to an ancient king, Ion. Grote does not share the belief of many writers that the names of the tribes were derived from their occupations, like those of the Egyptian castes, as Hopletes, the warriors, Ægikores, the goatherds, &c.; and he says of both tribes and titles, "Neither the time of their introduction nor their primitive import are ascertainable matters." In historic times each tribe was divided into three phratries (φρατρίαι or φράτραι), and each phratry generally into 30 gentes; later another division seems to have been made—purely for political and military convenience and without destroying the former—of each tribe into three trittys (τρίττυες), and of each trittys into four naukraries (ναυκράριαι). This classification of the people continued till the revolution of Clisthenes, in 509 B. C.; but Solon (about 594), without destroying it, made another division into five classes, on the basis of property. Clisthenes entirely abolished both methods of classification, and divided the people anew into ten tribes (φυλαί)—Erechtheis, Ægeis, Pandionis, Leontis, Acamantis, Œneis, Cekropis, Hippothoöntis, Æantis, and Antiochis—named from old Attic heroes. Each of these was subdivided into a certain number of demes (δήμοι) or cantons, every considerable place constituting a deme, and the larger towns including several. The whole number of demes in Attica appears to have been 174, of 160 of which the names are known. To the ten tribes of Clisthenes two more were afterward added for political purposes.—For the account of the system of general government of Attica under the archons and other rulers, and for the history of the country, see Athens, and Greece. Works especially devoted to Attica are Leake's "Demi of Attica" (2d ed., London, 1841), and Ross's *Demen von Attika* (Halle, 1846).—Joined with Bœotia, Megaris, and the adjoining islands, Attica as an eparchy now helps to form one of the nomarchies of the kingdom of Greece, called Attica and Bœotia; area, 2,481 sq. m.; pop. in 1870, 136,804. Capital, Athens.

ATTICUS, Titus Pomponius, a Roman knight, born in 109 B. C., died in 32. During the civil wars between Sylla and Marius he re-

moved to Athens, where he spent 20 years and rendered many services to the citizens, who raised statues in his honor. Recalled by Sulla in 65 B. C., he resided in Rome, and was celebrated for his hospitality, numbering among his friends Hortensius, Pompey, Cæsar, Brutus, and above all Cicero. He had no ambition, made a generous use of his great wealth, and during the civil wars was able to be on friendly terms with men of all parties. He starved himself to death to avoid other physical sufferings. He possessed a very extensive library, and employed his slaves to copy MSS., selling the copies. His annals, a general history extending over 700 years, were highly prized by classical writers, but have not come down to us. His name has been preserved by the letters addressed to him by Cicero, and by a biography written by Cornelius Nepos.

ATTICUS HERODES, Tiberius Claudius, a rich citizen of Athens, born about A. D. 104, died probably in 180. He opened a school of rhetoric at Athens and afterward at Rome, having Marcus Aurelius for one of his pupils. His speeches are said to have excelled those of all contemporary orators, but none of them are now extant. He was consul in 143, and for a time administrator of the free towns of Asia. Having inherited an immense fortune, he adorned Athens with magnificent public buildings, constructed a theatre at Corinth, aqueducts at Olympia and Canusium, a race course at Delphi, and a bath at Thermopylæ, and restored several decayed cities of the Peloponnesus.

ATTIKAMEGUES, or **Whitefish Indians,** an Algonquin tribe residing inland back of Three Rivers, Canada, closely allied in language to the Kilistenons or Crees. They were noted for their singular care and veneration for the dead. War and disease swept them away about 1658. Father Jacques Buteux, the great missionary of the tribe, was killed among them in May, 1652.

ATTILA (Magyar, *Etele;* Ger. *Etzel*), king of the Huns, died in 453 or 454. About 434, with Bleda, his brother, he succeeded Roas, his uncle, in the leadership of the nation, which then included or swayed the northern tribes from the Rhine to the Volga. The brothers threatened to invade the eastern empire, but Theodosius II. obtained peace by the surrender of territory south of the Danube and the payment of an annual tribute. Attila assured the Huns that he had discovered the sword of the Scythian god of war, with which he was to procure for them the dominion of the world. He called himself the scourge of God, and his subjects looked on him with superstitious awe. In 444 he ordered the murder of his brother as a dictate of the divine will, and the fratricide was celebrated as a victory. He invaded the Persian dominions, but being defeated in Armenia, he turned toward the eastern empire. With an army of upward of half a million men, mostly cavalry, he overran Illyria and all the region between the Black sea and the Adriatic. Theodosius II. was overpowered in three battles. Thrace, Macedonia, and Greece were devastated, and more than 70 of the most flourishing cities destroyed. Theodosius obtained peace again only by an enormous ransom. About 451 Attila turned west toward Gaul, marched through Germany, crossed the Rhine, the Moselle, and the Seine, and encamped before Orleans. The inhabitants, encouraged by their bishop Anianus, resisted the first attacks of the assailants, and were soon relieved, on June 14, by the approach of the army of Aëtius, the commander of the Romans, with their allies the Visigoths under Theodoric, the Franks under Meroveus, the Burgundians, the Alans, and other barbarians. Attila retired into Champagne, and took his stand in the Catalaunian plains where Châlons-sur-Marne is now situated, and there fought about the end of June the most murderous battle ever known in European history. (See Aëtius.) Attila was defeated, and recrossed the Rhine, but in the next year again assailed the empire, invading Italy. He destroyed Aquileia, Padua, Vicenza, Verona, and other cities, whose fugitives afterward founded Venice; pillaged Pavia and Milan, and established his camp at the confluence of the Mincio and the Po, near Mantua. Rome was saved by the personal mediation of Pope Leo I., who visited the barbarian in his camp, and is said to have awed him by his sacred character. The chroniclers say the spirits of the apostles Peter and Paul appeared to him with menaces, a legend immortalized by Raphael. In July, 452, Attila, having concluded a truce, returned to the Danube, meditating for the next year a new invasion of the eastern empire, or, as some maintain, a return to Italy. But he died in his capital or camp in Pannonia, the night of his nuptials with the beautiful Ildico, whom he had married in addition to the many wives he already possessed. The courtiers found him in the morning dead, either through sudden illness, or, as some suspected, through the treachery of Ildico, whose people, the Burgundians, had suffered much at his hands. His body was put in a coffin of iron, over which was one of silver, and a third of gold. He was buried secretly at night together with a mass of treasure and arms, and the prisoners who dug the grave were killed. He is also celebrated as a kind of national hero by the Hungarians.

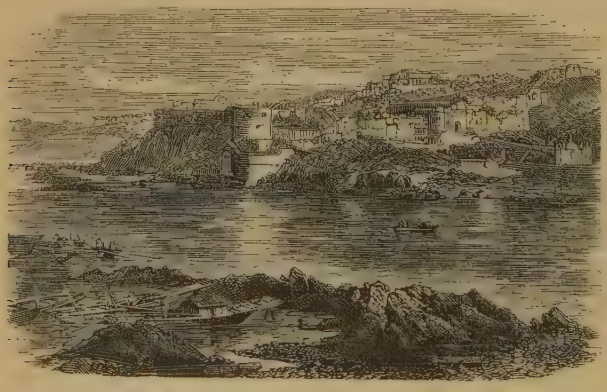
ATTIRET, Jean Denis, a French Jesuit and painter, born at Dole in 1702, died in Peking in 1768. He studied at Rome, and had already produced some good pictures when he entered the society of the Jesuits at Avignon. In 1737 he went to Peking, at the solicitation of the French Jesuit missionaries stationed there, and was employed by the emperor Kien Lung. He produced an immense number of paintings and drawings, mostly in water colors, accurately depicting Chinese physiognomy, dress, and habits, as well as triumphs, festivals, and pro-

cessions. A series of drawings, representing Chinese battles, were engraved in France, so gratifying the emperor that he appointed the artist a mandarin.

ATTIWANDARONK, a tribe of Indians of the same family as the Hurons and Iroquois, living in early times on both banks of the Niagara river, but chiefly on the Canada side. They were called Atirhagenratha by the Iroquois, and by the French the Neutral Nation, as they at first took no part in the war between the Iroquois on one side and the Hurons, Tionontatez, Algonquins, and Montagnais on the other. They were however at war with the Mascoutins beyond Lake Michigan. Their territory was an area of about 150 sq. m. They were first visited by the Recollect father Daillon in 1627, and by Brébeuf and Chaumonot in 1642; but no missions or posts were established. On the fall of the Hurons they were attacked by the Iroquois (1651–'3), and after severe losses a part submitted and joined the Senecas; the rest fled west and joined the remnant of the Hurons on Lake Superior.

ATTLEBOROUGH, a township of Bristol county, Mass., 31 m. S. S. E. of Boston, and 11 m. N. N. E. of Providence, R. I.; pop. in 1871, 6,769. It has very extensive manufactures of jewelry, printed calicoes, metal buttons, and clocks, for which there is abundant water power in Mill river.

ATTOCK, or **Atak,** a fortified town of India, in the Punjaub, on the Indus, nearly opposite the mouth of the Cabool, in lat. 33° 54′ N., lon. 72° 20′ E., 40 m. E. S. E. of Peshawer;



pop. about 2,000. The Indus is here about 800 feet wide, and from 30 to 70 feet deep according to the season, with high banks and a rapid current. The fort was built by Akbar to command the passage, this being the route by which invasions from the northwest have generally entered India. Runjeet Singh took it from the Afghans by treachery, and it came into the possession of the British by the conquest of Sinde. The town has gone to decay.

ATTORNEY. See Lawyer.

ATTORNEY GENERAL, a law officer of state. In England he is the counsel to the crown. He may be required by either of the houses of parliament to institute prosecutions for offences against the honor and dignity of the houses, or against the public laws of the nation, and by custom may prosecute for misdemeanors by information without first procuring an indictment. He may also file information in civil causes, under penal statutes, and he is charged by special statutes with other duties in the public interest.—The attorney general of the United States is the first law officer of the government. The judiciary act of 1789, which first defined his office, provided that there should be appointed a meet person, learned in the law, whose duty it should be to prosecute and conduct all suits in the supreme court in which the United States should be concerned, and to give his advice and opinion upon questions of law when required by the president or by the heads of any of the departments touching any matters which concerned the affairs of their offices. By an act of 1830 the attorney general was required to consult and advise with the solicitor general of the treasury as to the conduct of suits and other proceedings pertaining to the revenue; and by an act of 1861 he was charged with a general supervision and direction of the district attorneys and marshals of the United States, and of their discharge of their duties; and they were required to report to him an account of their proceedings and the condition of their offices. In practice also it has been conceded that either house of congress may call upon the attorney general for information on any matter within the scope of his office, and that it is his duty to communicate such information. He has also conducted all suits of the United States in the supreme court. It has been always understood that the opinion of the attorney general is not conclusive upon the president or the secretaries; but it has been the practice, for the sake of preserving harmony and uniformity of decision and action in the different departments, to govern the administration of their affairs according to the attorney general's advice. The opinions of the attorneys general from the earliest period have thus come to be a body of precedents on questions of public law which have a certain authority, of the same character, though not of the same imperative force, as the adjudication of courts of justice. It is a settled rule, in construction of the functions of this officer, that he has no right to give an opinion in any other cases than those in which the statutes make it his duty to give it. Therefore he will not give an opinion to any subordinate officer of any of the departments; nor will he give an opinion to individuals in respect to their claims against the government;

nor will he advise upon speculative or hypothetical cases, nor upon any point of law unless it has actually arisen in a case presented for the action of a department. An act of June 22, 1870, established an executive department of the government, called the department of justice, and made the attorney general the head of it. The statute provides for the appointment of a solicitor general and of assistants to the attorney general, and transfers to the department the solicitors of the treasury, of the navy, and of the internal revenue, the naval judge advocate, and the clerks and assistants of these officers. It authorizes the attorney general to refer questions submitted to him to his assistants, and their opinions approved by him have the force of his own. He may direct the solicitor general to argue causes in the court of claims in which the United States is interested, and appeals from that court to the supreme court in such cases as are committed to him and to the solicitor general. The secretaries of the war and navy departments may also by this act require opinions from the attorney general on questions of law the cognizance of which is not given by statute to other officers.—The duties of the attorney general of a state are defined by constitutional or statutory provisions. They are generally to prosecute and defend all kinds of actions in the event of which the people of the state are interested; to recover for the state escheated lands or forfeited estates; to test the right of any person who is charged with unlawfully holding or exercising any public office or any franchise within the state, or the right of persons who are alleged to be acting as a corporation without authority; to bring actions for the purpose of vacating the charters or revoking the franchises of corporations for violations of the provisions of the acts which created them, or when they have incurred forfeiture of their charters by nonuser of their franchises, or the assumption of privileges not conferred upon them. It is also his function to give legal advice to the governor and to other officers of the state; to prepare legal instruments for the use of the state; and at the request of the governor or other state officials to indict and prosecute persons accused by such officers of violations of the laws which they are charged with enforcing.

ATTORNEY, Power of, an authority by which one person is empowered to act in the place or as the attorney of another. The one who confers the power is called the constituent or the principal, and the one to whom it is given is called the attorney in fact, that is to say, *in factum* or for a special purpose, and by way of general distinction from a professional attorney at law.—All persons except those who have not a legal capacity to act for themselves, such as married women and infants, may appoint an attorney in fact. But under the recent acts which give married women separate estates and independent powers over them, they also may, as to such property at least, probably appoint attorneys. All persons who have sufficient intelligence may be made attorneys in fact, including even some who are disqualified from acting for themselves, such as married women and minors, provided they are of sufficient age and discretion. The power of attorney may for many purposes be created by parol, but usually it is reduced to writing. If the power contemplates the making of a deed by the attorney, his authority must also be by deed, that is to say, by writing under seal, and must be executed and acknowledged with the same formalities which are required in the case of deeds.—In the interpretation of powers of attorney they are to be construed strictly, and this rule should be kept in view in framing such instruments. The power may be broad or narrow. It may be general, extending to all the affairs of the constituent, or it may be special, and limited to some particular subject or to some particular class of the affairs of the principal. In view of the rule of construction just suggested, a special power should be very explicit, enumerating as minutely as is practicable all the acts which the attorney may perform, although all acts will be sustained which are fairly within the scope and design of the power, even though they are not specifically named. And the power had best be thus special and particular, if possible, rather than general; for the courts incline to construe even general powers narrowly rather than broadly, and even the general clause usually inserted in special powers, as for example, to do all other acts which the constituent might do in the premises, is usually interpreted with reference to the special matters enumerated, and is held to authorize only such acts as are fairly required in the performance of them. A general authority to make and indorse notes, the power being apparently conferred to enable the attorney to carry on the business of his principal in his absence, would be limited to notes to be used in that business; an authority to collect all demands, and to accomplish a complete adjustment of all the principal's affairs, would not authorize the attorney, in the course and for the purposes of such a general settlement, to give a note in the name of the principal; and it has been held that an authority to endorse notes does not empower the attorney to receive notices of protest, and that a general power given by a member of a firm to his copartner to transact all his business, whether relating to him as a partner or as an individual, does not authorize the attorney to transfer the individual property of the principal to a trustee for the payment of his debts. So a power to sell or convey lands does not give a power to mortgage, nor does it authorize such other dealing with the lands as a license to enter and cut timber. If the power looks to conveyance of real estate and to the giving of deeds, it should state expressly whether the attorney may exchange or lease or mortgage

the lands as well as convey them absolutely; and if the attorney is to give deeds, whether he may give deeds with full covenants; or if he is to make a mortgage, whether he may give with it a power of sale; though it has been held in New York that such an authority is fairly implied in a power to mortgage, because there a power of sale is a usual and virtually essential incident of a good mortgage, but it is not or may not be so in all the states. The power conferred may be a mere naked authority to the attorney, in which case it is revocable at the will of the constituent, and necessarily expires with his death; or it may be coupled with an interest in the attorney, as the phrase is, and in that case the power cannot be revoked by the principal, nor does his death annul it. Thus a mere power to collect debts due the principal is such a naked and revocable power. But if by assignment or by virtue of an agreement with the principal, or in any other way, the attorney has an interest in the very debts themselves, the power is then coupled with an interest, and the attorney cannot be compelled by the constituent to surrender it. A mere recital in the instrument that it is irrevocable will not make it so, unless one or other of these conditions exist. All conditions in the power must be strictly observed; as for example, if the consent of third persons is required, it must be procured; and if the consent of several persons were required, the death of one of them would prevent the execution of the power, for the consent even of all the survivors is not the consent that the power calls for.—It is a general rule of law that an authority given to one person cannot be delegated by him to another; and accordingly, when it is desired to give an authority to the contrary to the attorney, it must be expressly set forth in the power. Such a power, commonly called a power of substitution and revocation, is usually inserted in powers of attorney. When an attorney having such a power has appointed another attorney in his stead, his death annuls the power of his substitute. The death of the principal cancels the power of the attorney at once. And his power is annulled upon an actual revocation by the principal when the revocation is communicated to him, and as to third persons when it is made known to them. In executing the power, the attorney should act in the name of his principal. For example, if he gives a deed, the deed should run in the name of the principal, and be signed first with his name, the attorney adding his name and authority afterward.

ATTRACTION. See ADHESION, COHESION, GRAVITY, and MAGNETISM.

ATTUCKS, Crispus, a mulatto, or half-Indian, resident of Framingham, Mass., one of the persons killed on the evening of March 5, 1770, in the affray known as the "Boston Massacre." John Adams, in his defence of the soldiers, accuses him of having been the principal leader of the attack on the British troops. His body was placed with that of Caldwell in Faneuil hall, and from that building it was borne with great ceremony by the people, and buried in the city burial ground, in one vault with the other victims of the riot.

ATTWOOD, Thomas, an English composer, born in 1767, died in 1838. At the age of 16 he attracted the favorable notice of the prince of Wales, who sent him to Italy to be educated. At Vienna he was the pupil of Mozart till 1786, when he returned to England. He wrote operas, songs, glees, trios, and in the latter part of his life sacred music. His works are marked by knowledge of orchestral effects, and are vigorously written.

ATYS, or **Attys,** in Greek mythology, a son of Nana, a nymph, according to some legends, by a Phrygian king. The traditions differ about the fate of Atys, the most current ones making him beloved by Cybele, who made him her priest on his taking a vow of perpetual chastity; this he broke, and was punished by the goddess with madness, in which he castrated himself and attempted suicide; but the goddess restored him to his senses, and allowed him to continue in her service, decreeing at the same time that all her priests thereafter should be eunuchs. A festival was annually celebrated in memory of Atys at Pessinus. The myth is supposed by many writers to typify, in the powerlessness, death, and subsequent revival of Atys, the death of nature in the winter, and its revival in the spring through the agency of superior power.

AUBAGNE, a town of France, in the department of Bouches-du-Rhône, 10 m. E. of Marseilles; pop. in 1866, 7,408. The town is known for its excellent red wines. Near it the abbé Barthélemy was born.

AUBAINE, Right of (low Lat. *albanus*, a corruption of *alibi natus*, foreign born). See ALIEN, vol. i., p. 313.

AUBE, a department of France, in Champagne, bounded by Marne, Haute-Marne, Côte d'Or, Yonne, and Seine-et-Marne; area, 2,145 sq. m.; pop. in 1872, 255,687. The surface is mostly level; the soil in the southeast is productive, but in the remaining portions it is poor. It is traversed by the Seine and its eastern affluent the Aube, which rises in the plateau of Langres in Haute-Marne. The department has manufactories of pottery, tiles, and glass. It is divided into the arrondissements of Troyes, Arcis-sur-Aube, Bar-sur-Aube, Bar-sur-Seine, and Nogent-sur-Seine. Capital, Troyes.

AUBENAS, a town of France, in the department of Ardèche, situated on the right bank of the Ardèche and at the foot of the Cévennes, 13 m. S. W. of Privas; pop. in 1866, 7,694. It has a college and a theological seminary, and is the centre of the wine and corn trade of the department.

AUBER, Daniel François Esprit, a French composer, born at Caen, Jan. 29, 1782, died in

Paris, May 13, 1871. His father, a print-seller at Paris, in prosperous circumstances, allowed him to devote much attention to the study of music, merely as an amusement or an elegant accomplishment. After a brief experience in mercantile life in London, he returned to Paris, and devoted himself to music, giving forth a number of little compositions, vocal and instrumental, including a new arrangement of the opera *Julie*. After a course of study with Cherubini, he produced in 1813 the opera of *Séjour militaire*, which failed; and its reception so discouraged him that for several years he abandoned the art. The death of his father, however, compelled him seriously to devote himself to it as a means of support, and in 1819 he produced at the opéra comique *Le testament et les billets-doux*, an opera in one act, which was likewise unsuccessful. Next he wrote *La bergère châtelaine*, which was produced in the same theatre in the early part of the year 1820, and completely turned the tables in his favor. From this time forward he produced a great number of works, almost all of which were well received, while some are among the most successful operas now represented on the stage. An imitator of Rossini at the outset, he gradually acquired greater independence of style, and in *La muette de Portici* (also known as *Masaniello*) he formed a style of his own. In addition to the works mentioned, *Le cheval de bronze*, *Fra Diavolo*, *Le domino noir*, *Les diamants de la couronne*, *L'élixir d'amour*, *Le dieu et la bayadère*, *Gustave*, *La sirène*, and *Haydée* are among his most popular operas. Many of them have been translated into English and German, and almost all into Italian, and their melodies are familiar wherever music is known. *Marco Spada* was produced when he was 71 years of age; *La Circassienne* when he was 79; *La fiancée du roi de Garbe* when he was 82; and his last work, *Le premier jour de bonheur*, at the age of 86. The successful production of this opera in February, 1868, was made the occasion of enthusiastic demonstrations of the old maestro's popularity. He wrote a march for the opening of the world's exhibition in London in 1862. He was elected to the French institute in 1829, became a chevalier of the legion of honor in 1825 and grand officer in 1861, and succeeded Cherubini as director of the conservatory in 1842. The characteristics of Auber's music are sprightliness and grace, with clearness and simplicity in dramatic effect.

AUBERT, Constance. See ABRANTÈS.

AUBERVILLIERS, a village of France, in the department of the Seine, 1 m. N. of the enceinte of Paris; pop. in 1866, 9,240. E. of it is a fort of the same name, built in 1842. The village church formerly possessed a picture of the Virgin which was believed to be miraculous, and on that account was called Notre Dame des Vertus.

AUBIGNÉ, J. H. Merle d'. See MERLE D'AUBIGNÉ.

AUBIGNÉ, Théodore Agrippa d', a French Protestant soldier and historian, born at St. Maury, Feb. 8, 1550, died in Geneva, April 29, 1630. Even as a child his attachment to his religion attracted the attention of the Roman Catholics, and his refusal to abjure it caused him to be sentenced to death before he was 13 years of age. Aided by a friend, the boy escaped, and was present at the siege of Orleans. This ended, he went to pursue his studies at Geneva; but in 1567 he joined the Huguenot army under the prince of Condé, and served nearly two years with such bravery and ability as to secure the marked favor of the young Henry of Navarre, the future Henry IV. of France, whose service he subsequently entered, remaining with him through the war, and living at court after the peace. But he quarrelled with the king, his blunt candor and rude sarcasm constantly giving offence, and several times left or was compelled to leave Henry's service, though the king trusted him, and at one time bestowed offices of some honor upon him. He produced during his residence at court *Circé*, a tragedy, abounding in sarcasm directed against the king and various members of the royal family. After the king's death he published his first three volumes of the history of his time (from 1556 to 1601). The third volume was seized and burned by order of parliament, and he fled to Geneva, thus escaping the sentence of death that was soon pronounced against him. While under this condemnation, he offered his hand to a Genevese lady of the name of Burlamaqui, who did not hesitate to accept him as husband after he had revealed his dangerous position with his wonted candor. By a former marriage he had one son, Constantine, who became the father of the celebrated Madame de Maintenon. D'Aubigné was buried in the church of St. René at Geneva. Besides those already mentioned, he wrote many less noteworthy works.

AUBIN, a town of France, in the department of Aveyron, 16 m. N. E. of Villefranche; pop. in 1866, 8,863. It is the centre of a rich coal region, which has of late been yielding about 5,000,000 quintals of coal annually. The neighboring village of Le Gua has five furnaces for the smelting of iron.

AUBLET, Jean Baptiste Christophe Fusée, a French botanist, born at Salon, in Provence, in 1720, died in Paris in 1778. He is celebrated for his botanical labors in Mauritius and in French Guiana. His herbarium was purchased by Sir Joseph Banks, and is now in the possession of the British museum.

AUBURN, a city and the county seat of Cayuga county, N. Y., 174 m. by rail W. of Albany, and 2 m. N. of Owasco lake, the outlet of which intersects the town; pop. in 1860, 10,986; in 1870, 17,225. It stands on high, uneven ground, and is handsomely built, with wide streets planted with shade trees. It has 16 churches, of which 3 are Methodist, 4 Presbyterian, 3 Roman Catholic, 2 Episcopal, 2 Baptist, 1 Dis-

ciples', and 1 Universalist; and it is the seat of a Presbyterian theological seminary founded in 1821. To this has been recently added a large building for a library, the gift of William E. Dodge of New York and E. B. Morgan of Aurora. Auburn also has an orphan asylum, a home for the friendless, a young men's Christian association with reading-rooms, one high school, six district schools, and a young ladies' institute, eight banks, several hotels, and two opera houses. Two daily newspapers, four weeklies, and one monthly are published here. Water works on the Holley plan supply the city. The Auburn state prison, founded in 1816, is conducted on the "silent system." It is a fine massive structure of limestone, covering, with its cells, yards, and workshops, 12 acres. The prison buildings are arranged in the form of a hollow square, standing at a distance from the outer wall, which surrounds them. This wall, which is 3,000 ft. long, 4 ft. thick, and 12 to 35 ft. high, is manned night and day by guards. The prison has usually over 1,000 convicts (in 1872, 1,100), who are employed in a variety of manufactures, the proceeds of which are generally sufficient to defray the expenses of the institution. Each convict on arrival is assigned to work at the trade with which he is familiar, or, if ignorant of any, is taught one. Among the principal of these are the hame shop, tailors', shoemakers', cloth and carpet weaving, cabinet, sash and blind, cooper, stone-cutters', tool, axletree, smith, and machine shops. The convicts make such articles as they use, and build such structures as they occupy. They sleep in separate cells, but at meals and in the shops are together. No communication by word or sign is allowed. In an adjoining enclosure of nine acres is the state asylum for insane criminals, founded in 1857. It has usually 80 to 100 inmates. The Owasco lake supplies one of the best water powers in the state, which is utilized by nine dams, the river falling within the city limits 160 ft. There are upward of 20 factories and mills, the chief of which are those of cotton and woollen fabrics, carpets, agricultural implements (many of which are exported to Europe), machine shops and tool factories, flouring mills, and breweries. These manufactories employ a capital of from $4,000,000 to $5,000,000. Valuable limestone quarries are worked within the city limits. One of the two branches of the New York Central railroad runs through Auburn. The Southern Central railroad also passes through it, connecting it with Lake Ontario and the Pennsylvania coal mines. Auburn, formerly called Hardenburgh's Corners, was first settled by Capt. John L. Hardenburgh in 1793. At a short distance from the court house stands an elevation called Fort Hill, in the forest on the summit of which were found the ruins of an ancient Indian fortification and relics of its former occupants, such as arrow-heads, tomahawks, and pottery. It is now the site of a cemetery, prominent among whose monuments is one to the memory of Logan, the Cayuga chief.

Auburn State Prison.

AUBUSSON, a town of central France, capital of an arrondissement of the department of Creuse, built in a picturesque gorge near the river Creuse, 20 m. S. E. of Guéret; pop. in 1866, 6,625. It is celebrated for its manufacture of carpets, which employs the majority of the inhabitants. Woollen and cotton goods are also made, and there are dye houses, tan yards, and factories of various kinds. The town was founded in the 8th century, and was subject to a feudal lord, the ruins of whose castle are still visible.

AUBUSSON, Pierre d', grand master of the hospitallers, or knights of St. John of Jerusalem, born at Lamarche, France, in 1423, died in 1503. He is said to have first served in the Hungarian armies against the Turks. In 1444 he accompanied the dauphin, afterward Louis XI., in his campaign against the Swiss. He next repaired to the island of Rhodes, where he was admitted as a knight of St. John. He soon became a prominent member of the order, and on the death of the grand master Des Ursins he was unanimously elected his successor. When Mohammed II. threatened Italy, D'Aubusson had Rhodes strongly fortified, at the same time forming an alliance with the bey of Tunis and sultan of Egypt. Mohammed sent against Rhodes a fleet of 160 sail, carrying an army of 100,000 men, under the command of the apostate Misach Palæologus (Messih Pasha). The Turks invested the town of Rhodes at the end of May, 1480. D'Aubusson, who made an admirable defence, was so se-

verely wounded that his life was despaired of; but he compelled the Turks to raise the siege after two months. He now became active in the intrigues that troubled the court of Constantinople. He received at Rhodes Zizim or Jem, the brother of Sultan Bajazet, who became in his hands a powerful instrument of influence on the Turkish court. Zizim was first transferred to France, then delivered to Pope Innocent VIII., who rewarded D'Aubusson with the title of cardinal and the office of legate of the holy see in Asia. But the failure of a plan he had long cherished for the union of Europe against the Turks, together with other disappointments, caused him to retire from affairs, and his last years were spent in Rhodes.

AUCH, an old city in southern France, capital of the department of Gers, on the river Gers, 41 m. W. of Toulouse; pop. in 1866, 12,500. Its upper part is situated on a high hill crowned by an old Gothic cathedral, and connected with the lower by a long bridge of stairs. Auch is the seat of an archbishopric, a tribunal of commerce, and a college. It has manufactures of thread and cotton stuffs, and carries on a considerable trade, particularly in the brandies of Armagnac.

AUCHMUTY. I. Robert, an American lawyer, born probably in England, died in Boston in April, 1750. He was of Scotch descent, settled at Boston early in the 18th century, attained a high position in his profession, and was appointed judge of the court of admiralty in 1733. In 1741 he was in England as agent for the colony, and published there a pamphlet entitled "The Importance of Cape Breton to the British Nation, and a Plan for Taking the Place." **II. Robert,** son of the preceding, died in London in 1788. He was distinguished as an advocate and jury lawyer at Boston, and in 1767 was appointed judge of the court of admiralty, which office he exercised as long as the royal authority was recognized; but in 1776, being a zealous tory, he went to England. He was associated with John Adams in the defence of Capt. Preston. **III. Samuel,** an American clergyman, brother of the preceding, born in Boston, Jan. 26, 1722, died in New York, March 6, 1777. He graduated at Harvard college in 1742, and went to England to study for holy orders. After his ordination he was appointed by the society for the propagation of the gospel an assistant minister of Trinity church, New York, and in 1764 succeeded to the charge of all the churches in the city. When the American troops took possession of New York in 1775, he was forbidden by Lord Stirling to read the prayer for the king; but he persisted in doing so, although his church was entered by a company of soldiers with drums beating and with the threat of pulling him out of the pulpit. He then shut up the church and chapels and took the keys with him to New Jersey, leaving orders that the churches should not be opened until the liturgy could be read without interruption. New York being again in the British possession, he attempted to return, and succeeded after great hardships only to find his church and parsonage burnt, and his papers and the records of the church destroyed. The next Sunday he preached for the last time in St. Paul's. The various trials he had undergone brought on an illness which carried him off in a few days. **IV. Sir Samuel,** a British general, son of the preceding, born in New York, June 22, 1758, died in Dublin, Aug. 11, 1822. He graduated at Columbia college in 1775, and the next year entered the army under Sir William Howe, and took part in three campaigns. From 1783 to 1796 he served in India, and was at the siege of Seringapatam in command of a company under Lord Cornwallis. He was adjutant general in the expedition to Egypt in 1800. In 1806 he took command of the troops ordered to South America, with the rank of brigadier general, and in 1807 carried the strongly fortified city of Montevideo by assault. On his return he was made lieutenant general. In 1810 he was commander-in-chief in the Carnatic, and in 1811 took possession of the Dutch colonies of Java and Sumatra. On his return to Europe in 1813 he was appointed commander of the forces in Ireland.

AUCKLAND. I. William Eden, baron, a British diplomatist, born about 1750, died in 1814. In 1778 he was employed with Lord Carlisle in the attempt at a settlement of the rupture between the British government and the American colonies. He entered parliament, was secretary of Ireland, and was sent to the court of Louis XVI., where he negotiated a commercial treaty. On the breaking out of the revolution of 1789 he was sent to the Netherlands as envoy extraordinary; and for the manner in which he discharged his duties there he was called to an account by the house of commons on his return. He was created a baron in the Irish peerage in 1789, and also in the British peerage in 1793. He wrote "Principles of the Penal Laws" (1771), and various pamphlets, including one on the "State of the Poor in England." **II. George Eden,** earl of, son of the preceding, born in August, 1784, died Jan. 1, 1849. He was president of the board of trade under Earl Grey in 1830, and first lord of the admiralty under Lord Melbourne in 1834. The next year he went to India as governor general. During his administration of this office the opium war with China broke out, and the disastrous expedition against Afghanistan took place. Lord Auckland's chief personal action was exercised upon a system of native free schools, and an improved administration of justice. In 1841 he was succeeded by Lord Ellenborough, and on his return was created earl of Auckland and Baron Eden.

AUCKLAND. I. A province of New Zealand, occupying the north and centre of North island; area, about 30,000 sq. m.; pop. in 1871, 62,335, besides 16,000 Maoris. **II.** A city, capital of the preceding province and formerly of

Auckland, New Zealand.

New Zealand, on the S. shore of Waitemafa harbor, in lat. 36° 51′ S., lon. 174° 45′ E.; pop. in 1871, 12,937; with suburbs, 18,000, chiefly English, Irish, Scotch, and Germans. The town was founded in 1840, and became a borough in 1851. It includes an area of 16 by 7 m., is surrounded by four villages for pensioned soldiers, and divided into 14 wards, 11 of which are outside of the town. The streets are well laid out. There are several churches, including an English cathedral. St. John's college is 4 m. from the town. The number of registered vessels is upward of 100. Gold was first discovered near Auckland in 1852, but the mines are not as productive as those in other parts of New Zealand. Coal fields and petroleum were found in 1859 and 1867. The chief exports are gold, wool, and gum; the imports are manufactured goods, tea, tobacco, sugar, wine, spirits, and beer. Emigration to Auckland is checked by the insurrection of the Maoris, who in November, 1871, committed several murders in the province, including that of Bishop Patterson. The seat of the colonial government has within a few years been removed to Wellington.

AUCKLAND ISLANDS, a group lying between lat. 50° 24′ and 51° 4′ S., and lon. 163° 46′ and 164° 3′ E., 180 m. S. of New Zealand, and 900 m. S. E. of Tasmania. They were discovered Aug. 16, 1806, by Abraham Briscoe, master of Messrs. Enderby's English whaler Ocean, and called after Lord Auckland. They are of volcanic formation, and consist of three principal islands, the largest of which is Auckland proper, 30 m. long and 15 m. wide, with an area of 100,000 acres and a mountain 1,350 feet high. Port Ross, at the W. extremity of the island, contains an inlet called Laurie harbor, the station of the southern whale-fishing company of the Messrs. Enderby, to whom the islands were granted by the British government, and who obtained a charter for this company in 1849; but the establishment was broken up in 1852. The most northerly of the group are called Enderby islets. The island of Ichaboe contains guano deposits. The soil of the Auckland islands is very productive.

AUCTION (Lat. *auctio*, the act of increasing), a public sale, whereat persons openly compete, the property being sold to him who will give the most for it. In Holland, and at what are called Dutch auctions elsewhere, this process is reversed, the seller naming a price beyond the value of his goods, which is gradually lowered until some one closes with the offer. Rome, so far as is known, invented the auction, which was at first held for the sale of military spoils among the soldiers behind a spear stuck in the ground, whence it was called *auctio sub hasta* (under the spear), or *subhastatio*. The signal of the spear was afterward put up at all sorts of auctions, and the name was retained long after the signal was disused. After the death of Pertinax, A. D. 193, the prætorian guards put up the Roman empire at auction, which, after a number of bids by Sulpician and Didius Julianus, the sole competitors, was knocked down to the latter for 6,250 drachms (about $1,000) to each soldier.—In England sales "by the candle" or "by the inch of candle," which are still occasionally advertised, derive their name from an ancient practice of measuring the time within which the biddings must be completed by a candle, the highest bidder at the moment the inch burns out becoming the purchaser. The minimum price at which the owner was willing to part with his property was sometimes put under a candlestick—"can-

dlestick biddings;" and in the north of England still occur sales where the bidders do not know each other's offers—"dumb biddings."—In point of law, the auctioneer is the seller's agent, and as such has a special property in the goods, a lien upon them or upon the purchase money, where he is authorized to receive it, for his commission, the auction duty, and the charges of the sale. If he exceed his authority, or refuse to give the name of his principal, he renders himself personally liable. In sales of real estate he is usually authorized to receive the deposit, but not the residue of the purchase money. The conditions of sale and the plans and description of the property, if printed or written, control the oral statements of the auctioneer. Slight inaccuracies of description do not, but substantial ones do avoid the sale. A bid at an auction may be retracted before the hammer is down, and, in cases where a written entry is required to complete the sale, before that is made. For a bid is only an offer, which does not bind either party until assented to. Fraud upon either side avoids the sale. The employment of bidders by the owner is or is not illegal, according as circumstances tend to show bad or good faith. To employ them in order to prevent a sacrifice by buying in the property is, except where the sale is advertised as being "without reserve," allowable; but it is a fraud to use them for the purpose of enhancing the price through a fictitious competition. On the other hand, the sale is void if the purchaser prevails upon others to desist from bidding by appeals to their sympathy or false representations.

AUDE, a maritime department of France, in Languedoc, bounded by the Mediterranean and the departments of Pyrénées-Orientales, Ariége, Haute-Garonne, Tarn, and Hérault; area, 2,437 sq. m.; pop. in 1872, 285,927. It is subject to violent gales. The surface is mountainous and hilly, the soil generally productive. The canal of Languedoc intersects the northern part of the department from W. to E., and the canal of Robine or Narbonne crosses the eastern portion from N. to S. Corn and wine are abundant, and are exported. The river Aude rises near its S. border in Pyrénées-Orientales, flows N. as far as Carcassonne, and then along the S. bank of the Languedoc canal to Narbonne, a few miles E. of which it falls into the Mediterranean. The Lers, an affluent of the Ariége, flows along the W. border. The department is divided into the arrondissements of Carcassonne, Castelnaudary, Limoux, and Narbonne. It has manufactures of woollen cloths, paper, iron ware, brandy, salt, and earthenware. Capital, Carcassonne.

AUDEBERT, Jean Baptiste, a French painter and naturalist, born at Rochefort in 1759, died in 1800. He studied painting in Paris, and became distinguished for his miniatures. Having been employed to paint some specimens of natural history, he acquired an absorbing interest in the science. A journey through England and Holland furnished materials for a number of admirable designs, which appeared shortly afterward in Olivier's *Histoire des insectes.* The artist next prepared his *Histoire naturelle des singes, des makis et des galéopithèques* (Paris, 1800), containing 16 colored plates, and showing an equal facility in the author as designer, engraver, and writer. The splendor of his coloring had never been equalled, and by certain ingenious processes, such as the application of gold leaf variously tinted, he was enabled to reproduce the most gorgeous plumage of birds and insects. His substitution of oils for water colors is also considered a great improvement in the art of animal illustration. His other works, *Histoire générale des colibris, des oiseaux-mouches, des jacamars et des promerops* (Paris, 1802), and *Histoire naturelle des grimpereaux et des oiseaux de paradis,* were published after his death, and are still among the most esteemed of their kind.

AUDLEY, Thomas, lord, lord chancellor of England in the reign of Henry VIII., supposed to have been born at Earl's Colne, in Essex, died at his London residence in 1544. In 1529 he was made speaker of the house of commons in that long parliament which broke up the smaller religious houses throughout the kingdom. In 1532 he was knighted, and succeeded Sir Thomas More as keeper of the great seal, and on Jan. 26, 1533, became lord chancellor of England, which office he retained until his death. Audley presided at the trial of Sir Thomas More. In the distribution of the church lands, the priory of the canons of the Holy Trinity, usually called Christ church, in London, with all the real estate of the establishment, and the great abbey of Walden in Essex, fell to his share. The former he altered into a town residence for himself. In 1538 he was created Baron Audley of Walden. In 1542 he gave certain lands toward the support of the institution then known as Buckingham college, Oxford, which was thereupon incorporated under the name of St. Mary Magdalen.

AUDOUARD, Olympe, a French traveller and writer, born about 1830. Having separated from her husband, who was a notary of Marseilles, she visited Egypt, Turkey, Russia, and the United States, contributing to newspapers and delivering lectures in New York (1868) and in Paris (1869). Her principal works are: *Comment aiment les hommes* (1861; 3d ed., 1865); *Les mystères du serail et des harems turcs* (1863); *Les mystères de l'Égypte dévoilés* (1865); *Guerre aux hommes* (1866); *L'Orient et ses peuplades* (1867); *Lettre aux députés, les droits de la femme* (1867); and *A travers l'Amérique du Nord* (Paris, 1871).

AUDOUIN, Jean Victor, a French entomologist, born in Paris, April 27, 1797, died Nov. 9, 1841. He married the daughter of Alexandre Brongniart, with whom and with Dumas he established in 1824 the *Annales des sciences naturelles.* He succeeded Latreille as professor of entomology at the museum, obtained his

diploma as a physician in 1826, became subdirector of the library of the institute, founder and president of the entomological society, and in 1838 member of the academy. At the request of the government he investigated the injury caused by insects to the silk and vine culture, and published the results of his observations in the annals of the academy and of the entomological society. He described Savigny's zoölogical designs in the great work on Egypt published under the auspices of the government, contributed to various cyclopædias, and published with Milne-Edwards, his collaborator in many other works, *Recherches pour servir à l'histoire naturelle du littoral de la France* (2 vols., Paris, 1830); and with Milne-Edwards and Blanchard, *Histoire des insectes nuisibles à la vigne, et particulièrement de la pyrale, qui dévaste les vignobles* (Paris, 1842).

AUDRAIN, a N. E. county of Missouri; area, 680 sq. m.; pop. in 1870, 12,307, of whom 1,070 were colored. The surface is level or undulating; the soil is generally fertile and suitable for grazing. In 1870 the county produced 44,545 bushels of wheat, 648,963 of Indian corn, 292,435 of oats, 12,226 tons of hay, 6,850 lbs. of tobacco, 28,223 of wool, and 241,855 of butter. Capital, Mexico, on the North Missouri railroad.

AUDRAN, the name of a celebrated family of French engravers, all descending from Louis Audran, an officer of the wolf-hunt under Henry IV., whose son CLAUDE, born in 1592, settled at Lyons, became professor of engraving at the academy of that city, and died in 1677. GÉRARD, son of Claude, born at Lyons in 1640, studied three years at Rome under Carlo Maratti, and acquired fame by his engraving of a portrait of Pope Clement IX. Colbert invited him to Paris, where he, with almost unparalleled ability, engraved for Louis XIV. the best pictures of Le Brun. He was also the author of a work on the proportions of the human figure, published in folio, with 27 plates of ancient statues. He died in Paris in 1703. JEAN, brother of Gérard, born about 1667, had his studio in the Gobelins, and left a number of fine works of art, the most celebrated of which is his engraving of the *Enlèvement des Sabines*, after Poussin. He died in 1756. Several others of the family attained considerable distinction.

AUDUBON, a S. W. county of Iowa; area, 630 sq. m.; pop. in 1870, 1,212. It is intersected by an affluent of the Missouri. In 1870 the county produced 26,174 bushels of wheat, 98,150 of Indian corn, 7,100 of oats, and 3,457 tons of hay. Capital, Exira.

AUDUBON, John James, an American ornithologist, born on a plantation in Louisiana, May 4, 1780, died in New York, Jan. 27, 1851. He was the son of an officer in the French navy. When very young he showed the greatest fondness for birds, keeping many as pets. He made sketches of these, and, disclosing considerable talent as a draughtsman, was taken to France to be educated, and placed in the studio of the celebrated painter David. He was 17 years old when he returned to his native country, and he afterward became possessed of a fine farm on the banks of the Schuylkill in Pennsylvania. His researches into the habits of birds, and his drawings of them, absorbed his attention, and though unsuccessful at first in bringing his drawings before the public, he laid during the years of his life in Pennsylvania the foundations of the great work which he afterward produced. A severe trial befell him when, after having accumulated a large stock of the most carefully executed designs, he discovered that the whole of them had been destroyed by mice. After 10 years' residence in Pennsylvania, he removed to Henderson, Kentucky, where he embarked in trade. In 1810 he made the acquaintance of the Scotch ornithologist Alexander Wilson, who was then prosecuting his own researches in the American wilderness, and accompanied him in his excursions. The next year Audubon visited the bayous of Florida, gathering with his rifle and pencil new subjects for study. In 1824 he went to Philadelphia and New York, to make arrangements for the publication of the results of his labors; and for the same purpose he sailed for England in 1826. He was everywhere received by learned societies and scientific men with the utmost cordiality and enthusiasm. Among his warmest admirers in Great Britain were Jeffrey, John Wilson, and Sir Walter Scott; and in Paris, Cuvier, Geoffroy St.-Hilaire, and Humboldt. Of the 170 subscribers at $1,000 each to his splendid volume, the "Birds of America," nearly one half came from England and France. This volume was issued in numbers, containing five plates each, every object being of the size of life. By Nov. 11, 1828, eleven numbers of the work had appeared, with nearly 100 plates. In 1829 he returned to the United States, where he gathered materials for a new work, which he termed his "Ornithological Biographies." In 1832 he made another visit to England, where in the course of two years the second volume of the "Birds of America" was published, and a second volume also of the "Ornithological Biographies." In 1833, having returned for the last time to this country, he established himself in a beautiful residence on the banks of the Hudson, near the city of New York, where he commenced a new edition of the "Birds of America," in imperial octavo. This was finished in seven volumes in 1844. During this interval Audubon exhibited in the hall of the New York lyceum of natural history a collection of his original drawings containing several thousand specimens of birds and animals, all of which had been gathered by his own hand, all drawn as large as life, and all represented in their natural habitats or localities. He next projected a work on the "Quadrupeds of America," on the same imperial scale with that on the birds. For this purpose he began, in company

with his sons, Victor Gifford and John Woodhouse, who both inherited much of his talent as an artist as well as a naturalist, a new course of travel. But the approach of old age induced his friends to dissuade him from the more toilsome expeditions which he thought necessary to complete this scheme. A great deal of the labor was performed for him by his friend Dr. Bachman, of Charleston, S. C., and he was largely assisted in the other departments by his sons. He died before the work was ended. His sons completed and published the "Quadrupeds of America," in folio and imperial octavo volumes, uniform with the two editions of the "Birds," but died without executing their cherished design of writing a biography of their father. Mrs. Audubon, now (1873) upward of 80 years of age, prepared, with the aid of a friend, a memoir which appeared in New York in 1869, entitled "The Life of John James Audubon the Naturalist," accompanied by a portrait after Henry Inman's well known picture, and a view of Audubon's residence. The work was also published in London. Audubon was a fellow of the Linnæan and zoölogical societies of London, of the natural history society of Paris, of the Wernerian society of Edinburgh, of the lyceum of natural history at New York, and an honorary member of the society of natural history at Manchester, of the royal Scottish academy of painting, sculpture, and architecture, and of many other scientific bodies.

AUENBRUGGER VON AUENBRUG (often called AVENBRUGGER), **Leopold,** the inventor of the method of investigating internal diseases by percussion, born in Gratz, Styria, Nov. 19, 1722, died in Vienna, May 18, 1809. He was physician to the Spanish hospital in Vienna, and first made known his discovery in a treatise entitled *Inventum Novum ex Percussione Thoracis Humani Interni Pectoris Morbos Detegendi* (Vienna, 1761), which was translated into French by Rozière (1770), and again by Corvisart (1808), and into English by Dr. John Forbes (1824.) (See AUSCULTATION.)

AUERBACH, Berthold, a German author, of Jewish parentage, born at Nordstetten in the Black Forest, Feb. 28, 1812. He studied theology and jurisprudence at Tübingen, and philosophy and history at Munich and Berlin. His earliest historical novels treat of Judaism, as *Spinoza* (2 vols., Stuttgart, 1837), and *Dichter und Kaufmann* (2 vols., 1839); and in 1841 he published a German translation of Spinoza's works in 5 vols., with a highly appreciative biographical notice. Subsequently he became celebrated by his descriptions of German village life, remarkable for an abundance of philosophical reflections and poetical feeling, especially by his *Schwarzwälder Dorfgeschichten* (4 vols., 1843–'54; English translation, "Black Forest Village Stories," 1869); his popular political almanac, *Der Gevattersmann* (1845–'8; republished in *Schatzkästlein des Gevattersmanns*, 1856); *Schrift und Volk* (1846); *Neues Leben* (1851); and still more by his *Barfüssele* (1856; English translation, "Little Barefoot," 1867); *Joseph im Schnee* (1860; English translation, "Joseph in the Snow," 1867); *Edelweiss* (1861; English translation, 1869); *Auf der Höhe* (1865; English translation, "On the Heights," 1868); and *Das Landhaus am Rhein* (1869), of which there are several English translations under the titles of "Villa Eden" and "Villa on the Rhine." The tale, *Die Frau Professorin* (1848; English translation, "The Professor's Lady," new ed., 1871), used by Madame Birch-Pfeiffer in her drama, *Dorf und Stadt*, is regarded as one of his most characteristic works. A number of his tales were published in an English translation in 1869 under the title of "German Stories," and in French in 1853 under that of *Contes d'Auerbach*. There are various other translations from his works in English, French, Dutch, and Swedish. He has also written a tragedy, *Andree Hofer* (Leipsic, 1850), and a drama, *Der Wahlspruch* (1856), but they were not as successful as his tales. His principal political work is *Tagebuch aus Wien* (Breslau, 1849; English translation, "Events in Vienna," London, 1849). Since 1858 he has edited in Berlin a popular almanac, *Deutscher Volks Kalender*, and he chiefly resides in that city. A new edition of his complete works was published in Stuttgart in 1871. During the Franco-German war he accompanied for some time one of the German princes, and wrote letters for a German newspaper.

AUERBACH, Heinrich, a medical professor and senator in Leipsic, born in 1482, died in 1543. His real name was Stromer, but he adopted the name of his native town, Auerbach, in Bavaria, and in 1530 erected a large building in Grimma street, Leipsic, which is still known as the Auerbachshof. Auerbach was a friend of Luther, and when the discussions between the reformer and Eck took place at Leipsic, he offered to his friend the use of his house and table. A principal feature of the Auerbachshof is the cellar in which Luther drank, and out of which, according to popular tradition, Dr. Faust rode upon a barrel, an event illustrated by a painting which still decorates the subterranean walls.

AUERSPERG, Anton Alexander, count (popularly known as ANASTASIUS GRÜN, his *nom de plume*), a German poet, born at Laybach, April 11, 1806. He belongs to an ancient family which originated in Swabia, and subsequently settled in Carniola, where it acquired extensive estates. He early became prominent in the liberal party of Austria, was a member of the Frankfort preliminary parliament, and of the national assembly in the same city (1848), in which he was esteemed eloquent, and took a conspicuous part in the diet of Carniola from 1861 to 1867, after which his ultra-German tendencies made his position in that assembly so unpleasant that he procured his election to the diet of Styria. Since 1861 he has been a

life member of the upper house of the Austrian Reichsrath, and in 1868 he was unanimously chosen first president of the Cisleithan delegation. The degree of doctor of philosophy was conferred upon him in 1865, on occasion of the 500th anniversary of the university of Vienna. He holds a high rank among the lyrical and epic poets of Germany, especially excelling as a humorist and a political satirist. Among his most renowned works are: *Der letzte Ritter* (Stuttgart, 1830; English version by John O. Sargent, New York, 1871), *Spaziergänge eines Wiener Poeten* (Hamburg, 1831), *Schutt* (Leipsic, 1835), and *Gedichte* (1837).

AUERSPERG, Carlos, prince, an Austrian statesman, born May 1, 1814. Though the head of the principal branch of his family, one of the oldest in the empire, he lived in retirement on his estates till the reëstablishment of constitutional government by the imperial patent of February, 1861. He was appointed by Schmerling president of the upper chamber of the Vienna Reichsrath, and has since in various capacities, in that assembly and as representative of the Bohemian landed nobility at the diet of Prague, performed a very conspicuous part in defence of the constitutional system against clerical and feudal reaction, of the interests of the German nationality against the Czechs, and of the unity of the empire against federation. He readily accepted, however, the dualistic platform of 1867, and coöperated in establishing and maintaining the new order of things in Austro-Hungary. Early in 1868 he became president of the so-called "citizens' cabinet" in Cisleithan Austria, but the transactions of Count Beust, the imperial chancellor, with the Czechs obliged him to retire in the autumn of the same year. He remained in opposition during the administrations of Count Potocki and Hohenwart, and is now (1873) a zealous supporter of the liberal cabinet headed by his brother Adolph (born July 21, 1821).

AUERSTÄDT, a village of Thuringia, in the Prussian province of Saxony, 10 m. W. of Naumburg, famous for Davoust's great victory over the Prussian army under the duke of Brunswick on the same day on which Napoleon defeated the main army of Frederick William III. at Jena, Oct. 14, 1806. Davoust, with 35,000 men, beat 50,000, and Napoleon made him duke of Auerstädt. (See JENA.)

AUGEAS, or **Augias,** a mythical king of Elis, the cleansing of whose stables was one of the 12 labors of Hercules. (See HERCULES.) When the hero demanded the stipulated reward, Augeas refused to give it to him; whereupon Hercules slew him and all his sons save Phyleus, whom he made king in the room of his father.

AUGER. See BORING.

AUGEREAU, Pierre François Charles, duke of Castiglione, a French soldier, born in 1757, died in June, 1816. At an early age he entered the Neapolitan army, in which he continued a private until he was 30 years old, when he settled at Naples, and gained his livelihood by teaching fencing, until, being suspected of revolutionary principles, he was ordered to quit Italy. Entering the French republican army of the south, he rose rapidly from grade to grade, merely by intrepidity, for he had no military genius. His numerous and contemptible vices made him everywhere hated, but he had great physical courage. In 1794 he was made brigadier general in the army of the eastern Pyrenees, and afterward general of division. On the peace with Spain he was appointed to the army of Italy, and served in all its campaigns under Bonaparte. By his charge at Lodi he decided the victory, and he still more distinguished himself by storming the position of Castiglione (1796). On the overthrow of the directory, on the 18th Fructidor (1797), he expected the succession to one of the expelled directors; but being disappointed, he affected the severe republican, and on Bonaparte's return from Egypt held aloof from him until after the revolution of Brumaire (1798). Shortly after the establishment of the empire he was rewarded with the baton of a marshal, and created duke of Castiglione (1805). He fought bravely in the wars with Austria and Prussia (1805 and 1806), especially at Jena. At Eylau (1807), when so ill that he could hardly sit upright, he compelled his servants to tie him to his saddle, and thus led his column into the fight. Being wounded, however, he was compelled to fall back, his men were thrown into disorder, and Napoleon unjustly sent him home in disgrace. In 1810 he served in Spain, and in 1813 distinguished himself at Leipsic; and when France was invaded in 1814, he was intrusted with the defence of Lyons, which he pledged himself to maintain to the last; but failing through want of means to make good his word, he was again unjustly disgraced. While in retirement at Valence, a proclamation appeared in his name stigmatizing the emperor as "an odious despot, and a mean coward, who knew not how to die as becomes a soldier;" and although the authenticity of the document has been denied by his defenders, Napoleon believed in it. On the way to Elba, Napoleon met his ex-marshal, on the road near Valence; and both descending from their carriages, an interview followed, which terminated in an altercation. Augereau gave in his adhesion to Louis XVIII., received the cross of St. Louis and the command of the 14th division, and was appointed a peer of France. On the return of Napoleon from Elba, he remained inactive until the emperor was actually in Paris, when he would have returned to his party, but Napoleon would not trust him. On the second restoration of the Bourbons, he would again have made his peace with the king; but finding no encouragement, he retired to his seat at La Houssaye, where he died.

AUGIER, Guillaume Victor Émile, a French playwright, born in Valence, Sept. 17, 1820.

He produced his first play, *La ciguë*, in 1844. His comedy *Gabrielle* (1849) placed him at the head of the so-called common-sense school of dramatists. Many of his subsequent comedies were of a lower tone, but more brilliant. Among the most successful are: *Le gendre de M. Poirier* (jointly with M. Sardou, 1855), *Le mariage d'Olympe* (1855), *Les effrontés* (1861), and *Maître Guérin* (1864). He succeeded Salvandy as member of the French academy, Jan. 2, 1858.

AUGITE, a mineral species synonymous with pyroxene; also used by Prof. Dana to designate a section or group of species of the class of anhydrous silicates. (See PYROXENE.)

AUGLAIZE, a W. county of Ohio; area, 399 sq. m.; pop. in 1870, 20,041. The Miami canal and the Dayton and Michigan railroad pass through the county. Near the western boundary is a reservoir 9 m. long, formed to supply the canal, and occupying the most elevated site between the channel of the Ohio river and Lake Erie. It is drained in part by Auglaize river, a tributary of the Maumee at Defiance. The surface is nearly level, well wooded, and the soil is good. In 1870 the county produced 269,756 bushels of wheat, 13,046 of rye, 245,277 of oats, 34,584 of barley, 379,015 of Indian corn, 14,694 tons of hay, 76,650 lbs. of wool, and 246,085 of butter. There were 29,678 sheep and 19,809 hops. Capital, Wapakoneta.

AUGSBURG, a city of Bavaria, situated between the rivers Wertach and Lech, at their confluence, 33 m. N. W. of Munich; pop. in 1871, 51,284. It is one of the most ancient German cities. Augustus, having conquered the Vindelicians in 12 B. C., established there a colony called Augusta Vindelicorum, on a

Augsburg.

spot, according to some, already inhabited and called Damasia. The Huns destroyed it in the 5th century; and during the wars between Thassilo, duke of Bavaria, and Charlemagne, it suffered much. In 1276, having become rich by trade and industry, the city bought its freedom from the duke of Swabia. Its prosperity increased continually. It was the principal emporium for the trade between northern Europe, the countries on the Mediterranean, and the East, previous to the discovery of America and the doubling of the Cape of Good Hope. Its merchants, including the celebrated Fuggers, possessed vessels on all the seas then known. Its greatest prosperity was toward the end of the 15th and the first part of the 16th century. The arts had here their focus, and the Holbeins and other names known in the history of German art belonged to it. After the war against the league of Smalcald the decline of Augsburg began. Here on June 25, 1530, the Protestant princes submitted to Charles V. the confession of their faith, which bears in history the name of the "Confession of Augsburg." In 1555 the religious peace between that emperor and the Protestants was concluded here. At the dissolution of the German empire, Augsburg lost its privileges as a free city, and was incorporated with Bavaria. It is now the capital of the circle of Swabia and Neuburg, and is the seat of various superior administrative, judicial, and clerical boards. In Augsburg is published the *Allgemeine Zeitung*, one of the foremost political and literary journals of the world, issued by the great publishing house of Cotta. The city possesses a large public library, which is increasing daily. The collection of various manu-

scripts, records, and official documents in the archives of the city, is of great importance, chiefly for the history of the reformation. In 1870 there were 10 book-printing establishments, 34 publishing houses, 5 great cotton factories, 74 breweries, and manufactories of gold and silver wares, machinery, paper, &c. Among the new public buildings is a synagogue opened in 1867. Augsburg is a considerable commercial and financial centre, having 24 bankers. The history of the ancient free city is contained in vols. iv. and v. of the *Chroniken der deutschen Städte* (Leipsic, 1865–'7).

AUGSBURG CONFESSION, the first Protestant confession of faith, and the basis of the present faith in Protestant Germany. Charles V., soon after his accession to the throne of Germany, summoned Luther to the diet of Worms (1521), and afterward issued an edict of outlawry against him and his adherents. But the insurrection in Castile and the war with France and Italy called him away. The edict of outlawry was inefficiently enforced, and the influence of the Lutherans was permitted to increase during the nine years of the emperor's absence. The diet of Spires (1529) had issued a decree for the purpose of conciliating the Lutherans by a proposed Roman Catholic reform, and uniting them against the Sacramentarians and Anabaptists. The Lutherans protested (hence Protestants), and made an unsuccessful effort to unite with Zwingli. At this juncture the emperor returned (1530). The German princes and estates were summoned to convene in diet at Augsburg in June. The summons called for aid against the Turks, making no reference to the religious difficulties of the kingdom, further than to promise at no distant time a speedy adjustment of them. On the 25th of the month a confession, prepared by Melanchthon and approved by Luther, was read in the diet. Two days later it was delivered to the Roman Catholic theologians for a reply. This was read in the diet on the 3d of August following, and called forth from Melanchthon a defence (*Apologia Confessionis*), which was afterward enlarged and published in Latin, and then in German. The object of the Augsburg Confession was not attained, and the edict of the emperor (Sept. 22) gave the Lutherans until the following April to bring themselves into conformity with the requirements of the church, and demanded their coöperation with the throne against the Zwinglians and Anabaptists. The Augsburg Confession and Melanchthon's defence were generally circulated in western Europe, and became a rallying point among the reformers. About 1540 Melanchthon made some important changes in the Confession. This form, known as the *Confessio variata* (the "altered Confession"), was received until 1580, when the *Confessio invariata* (the "unaltered Confession") was formally adopted as the standard of the Lutheran churches.—The Augsburg Confession comprises two parts, besides the appended *Apologia*, or defence. Part I. comprises 21 articles, of the contents of which the following is an abstract: 1 treats of God and the Trinity, in accordance with the Nicene creed; 2 asserts that all men since the fall are born with sin; 3 treats of the person and mediation of Christ, in accordance with the Apostles' creed. 4. Justification is the effect of faith, exclusive of good works. 5. The Word of God and the sacraments are the means of conveying the Holy Spirit, but never without faith. 6. Faith must produce good works, but not to merit justification. 7. The true church consists only of the godly. 8. Sacraments are valid though the administrators are evil. 9. Infant baptism is necessary. 10. The real presence in the eucharist exists only during the period of receiving; the sacrament to be received in both kinds. 11. Absolution is necessary, but not particular confession. 12 is against the Anabaptists. 13. All who receive the sacraments must have actual faith. 14. No one can teach in the church or administer the sacraments without having been lawfully called. 15. Holy days and church ceremonies to be observed. 16. Of civil matters and marriage. 17. Of the resurrection, last judgment, heaven, and hell. 18. Of free will. 19. God is not the author of sin. 20. Good works are not wholly unprofitable. 21 forbids the invocation of saints. Part II. comprises seven articles: 1 enjoins communion in both kinds, and forbids the carrying out of the sacramental elements; 2 condemns the law for the celibacy of priests; 3 condemns private masses, and directs that some of the congregation shall always communicate with the priest; 4 denies the necessity of auricular confession; 5 is against tradition and human ceremonies; 6 condemns monastic vows; 7 discriminates between civil and religious power, the power of the church consisting only in preaching and administering the sacraments. The *Apologia* consists of 16 articles, treating of original sin, justification by faith, fulfilment of the law, penitence, repentance, confession, satisfaction, sacraments, ordinances, invocation of saints, communion in both kinds, celibacy, monastic vows, and ecclesiastical jurisdiction. — Gieseler's "Church History," edited by Prof. H. B. Smith, vol. iv., p. 432 (New York, 1861), furnishes a summary of documents relating to the Augsburg Confession.

AUGUR, Hezekiah, an American sculptor, born in New Haven, Conn., Feb. 21, 1791, died there, Jan. 10, 1858. In early life he produced several works of statuary, of which his "Jephthah and his Daughter," in the Trumbull gallery of Yale college, is the best. In addition to his skill as a sculptor, he possessed much mechanical genius. His most celebrated achievement is his invention of the carving machine, which is at the present day in general and successful operation.

AUGURS, diviners among the Romans. The practice of divination flourished in Chaldea and Egypt; from the latter country it passed to Greece, whence the Romans received it.

In Greece and Rome astrology proper ceased to have the importance in augury which it had maintained in Chaldea, while, as the word augury (*avigerium*) itself would indicate, the preëminence had been given to omens taken from the flight of birds. Both among the Greeks and Romans much of the art of augury depended on the cardinal points of the compass. The Greek augurs always faced the north, while the Roman augurs faced the south. Omens in the east were generally lucky, while those in the west were unlucky. Hence the Greek had his right hand synonymous with good fortune, the Roman originally his left. Later in Roman history, however, *sinister* (left) became a synonyme for bad fortune, and *dexter* (right) for good. Auguries were made both from the flight and cries of birds. Lightning was also observed by the augurs, as well as other striking phenomena, such as meteors, winds, and eclipses. The direction in which a bird flew, the crowing of a cock, the line of the electric flash, and the manner in which a cooped chicken picked his corn, were prominent augurial elements. Some even more trivial and accidental occurrences were reckoned ominous, such as an animal crossing one's path, a fit of sneezing or sudden melancholy, the spilling of salt on the table, or of wine upon one's clothes. The power of the Greek and Roman augurs was very great. They held their offices for life, regardless of character. In Rome they were at first three in number, and were chosen one from each of the three tribes of the patricians. They were elected by the *comitia curiata*, a patrician assembly, until the Ogulnian law (300 B. C.) admitted the plebeians and enlarged the number of augurs, then four, to nine, subsequently increased to 15. Every election had to be ratified by the college itself. This original power of veto afterward resulted in the usurpation by the college of the right to elect its own members by coöptation (452 B. C.), which right they retained, with the exception of the first election of plebeian augurs, for 348 years, until the passage of the Domitian law (104), which removed the power of election to the tribes. The most authoritative enactments of the *comitia* were repeatedly annulled by the entrance of an augur into the assembly, pronouncing the words *Alio die* ("On another day"). The order of augurs gradually declined after the admission of the plebeian element, until it was abolished, with paganism in general, by Theodosius the Great, about A. D. 390.

AUGUST, the 8th month of the year, derived from the Roman calendar. The Romans called it originally Sextilis, or the 6th month of their year, which began with March. Julius Cæsar made it 30 days in length, and Augustus increased it to 31. As it was the month in which Augustus Cæsar had entered upon his first consulship, had celebrated three triumphs in the city, had received the allegiance of the soldiers who occupied the Janiculum, had subdued Egypt, and put an end to civil war, the senate, in order to flatter him, changed the name of the month to Augustus, in the same way that Quinctilis had been changed to Julius under Julius Cæsar. The Flemings and Germans have adopted the word August to signify harvest. Thus *oogst maend* (Flemish) is the harvest month; so the German *Augstwagen*, a harvest wagon; and the Dutch *oogsten*, to gather corn from the field. The Spaniards use the verb *agostar*, to gather in harvest; and the French and Spaniards have the phrases *faire l'août* and *hacer su augusta*, to signify harvesting. The Saxons in Britain named August the weed month. The old Germans named it *Weinkoch*, the wine-press month.

AUGUST FRIEDRICH EBERHARD, prince of Würtemberg, uncle of King Charles I., a Prussian general of cavalry, born Jan. 24, 1813. He entered the Prussian service in 1830, became in 1858 commanding general of the Prussian guards, and took part in the wars against Austria (1866) and France (1870), favorable mention of his name being made in the reports of the battles of Gravelotte and Sedan.

AUGUST WILHELM, prince of Prussia, brother of Frederick the Great, and general of the Prussian army, born in Berlin in 1722, died in 1758. He took an active part in the Silesian campaigns, and distinguished himself at the battle of Hohenfriedberg (June, 1745); but in the seven years' war, owing to the fatal retreat of Zittau in 1756, he incurred the displeasure of his brother, and withdrew from the army. This conflict between the two brothers led to a correspondence, which was published in 1769.

AUGUSTA, a N. W. county of Virginia, bordering on West Virginia and the Blue Ridge; area, 900 sq. m.; pop. in 1870, 28,763, of whom 6,737 were colored. It was distinguished for its loyalty to the revolutionary cause, for which it was commended by Washington. The surface is elevated and uneven; the soil, which is drained by the sources of the Shenandoah and James rivers, is calcareous, and one of the most fertile in the state. In 1870 the county produced 463,276 bushels of wheat, 29,835 of rye, 280,380 of Indian corn, 234,492 of oats, 19,671 tons of hay, 23,291 lbs. of wool, and 353,335 of butter. The quantity of hay was greater than in any other county of the state, and of wheat and butter than in any other except Loudon. Extensive beds of anthracite coal have been opened. The celebrated Wyer's or Wier's cave, Madison cave, and the Chimneys are in this county. Capital, Staunton.

AUGUSTA, a city of Maine, capital of the state and of Kennebec county, situated at the head of sloop navigation on the Kennebec river, 43 m. from its mouth, 63 m. by railroad N. N. E. of Portland, 72 m. S. W. of Bangor, and 171 m. N. N. E. of Boston; pop. in 1860, 7,609; in 1870, 7,808. The city lies on both sides of the

river, which is spanned by a bridge 520 ft. long. It is well laid out, and has many handsome buildings and a great abundance of shade trees and shrubbery. The state house, built of white granite, is considered the handsomest in New England except that of Montpelier, Vt.; the court house is the best and most convenient in the state; and the Maine insane asylum is a splendid granite structure, overlooking a landscape of peculiar beauty. The United States arsenal is on the E. side of the river. Just above the city a dam 1,000 ft. long provides an immense water power, while canals at each end render the river navigable N. of Augusta. The Maine Central railroad (Augusta division) runs through the city. There are 8 churches, 7 hotels, 5 newspapers (1 daily and 4 weekly), 3 banks, and 2 savings institutions. Lumber forms the chief manufacturing interest. An extensive cotton factory has recently been erected here.

AUGUSTA, a city of Georgia, capital of Richmond county, at the head of navigation on the Savannah river, 132 m. by railroad N. N. W. of the city of Savannah, and 137 m. N. W. of Charleston, S. C.; pop. in 1860, 12,493, of whom 4,049 were colored; in 1870, 15,386, of whom 6,390 were colored. It was laid out in 1735, and became an important point in military operations during the revolutionary war, being alternately in the possession of the royal troops and the Americans. The city was incorporated in 1798, and the chief magistrate bore the appellation of intendant until 1818, when the first mayor was elected. The city is very handsomely laid out on an extended plain on the W. bank of the Savannah river, with wide streets crossing each other at right angles. The principal business thoroughfare, Broad street, is 2 m. long and 165 ft. wide. Greene street, the most beautiful in the city, is 168 ft. wide, and has a row of stately shade trees on either side along its entire length. The principal buildings are the city hall, masonic hall, odd fellows' hall, and the opera house. The city hall was completed in 1824 at a cost of $100,000. In front of it stands a granite monument 45 ft. high, erected by the city in 1849 to the memory of Hall, Gwinnett, and Walton, signers of the Declaration of Independence. An orphan asylum, 178 ft. by 78, is building at a cost of $150,000. The medical college of Georgia, situated here, in 1868 had 8 professors, 97 students, and a library of 4,000 volumes. The city water works were completed at a heavy cost in 1861. The water is drawn from the canal and forced into a tank holding 185,000 gallons in a cylindrical brick tower standing 115 ft. above the general level of the city. The Augusta canal, 9 m. long, brings the waters of the Savannah river near the city, some 40 ft. above the level, and thus affords inexhaustible power for factories. Chief among these is the "Augusta Factory," with 508 looms, employing 500 hands and producing in 1871 8,527,728 yards of cloth. There are 5 extensive flouring mills, which in 1871 consumed about 409,000 bushels of corn and wheat. In 1871 the city contained 6 banks, 4 founderies (besides the extensive foundery and machine shops of the Georgia railroad), 2 tobacco factories, 4 hotels, 21 churches (8 of which are for colored people), 2 academies, an arsenal, several hospitals, and many benevolent societies. There were 700 white and 500 colored pupils enrolled in the public schools. There are 2 daily newspapers, 2 weekly, 1 semi-monthly, and 1 monthly published here. In 1869 the assessed value of real estate, exclusive of the Augusta factory property, was $6,300,000, and in 1871, $6,593,420. For the year ending April 1, 1869, the sales of cotton amounted to $8,246,867, and for the year ending April 1, 1871, $11,575,846. The bonded debt of the city on Jan. 1, 1871, was $1,355,250, while the assets amounted to $1,302,610. Augusta has railroad communication with all the leading markets of the country. The Central railroad extends from Augusta to Savannah and Macon; the Charlotte, Columbia, and Augusta, from Augusta to Charlotte, N. C., via Columbia, S. C., being an important link in the great short passenger route between New York and New Orleans; the main line of the Georgia railroad extends from Augusta to Atlanta, with branches to Washington, Warrenton, and Athens. The Macon and Augusta railroad affords connection with the former city, and the South Carolina railroad connects Augusta with Charleston, Columbia, and Camden, and with the Wilmington and Manchester railroad at Kingville. Several other railroads are projected, the most important of which is the Port Royal railroad to Port Royal, S. C., a distance of 110 m., which will give Augusta a shorter route to the seaboard.—The arsenal at Augusta was seized by the confederate authorities Jan. 24, 1861.

AUGUSTA, John, a Bohemian theologian, born in Prague in 1500, died Jan. 13, 1575. He studied theology at the school of Waclaw Koranda. On the death of this master Augusta went to Wittenberg, and entered into close communion with Luther and Melanchthon. He became later bishop of the Bohemian Brethren, brought about an agreement between that sect and the Protestants, and induced the Brethren to refuse their coöperation to Ferdinand I. in the Smalcaldic war against the Protestants; a contumacy which Ferdinand avenged after the war was over by banishing the whole sect and arresting the principal preachers. Augusta, who had attempted to escape in the garb of a peasant, was taken in chains to Prague, and thrown into prison. He was offered his liberty on condition of making public recantation and becoming either a Catholic or a Utraquist. He was ready to profess himself a Utraquist, but not to recant in public, and he accordingly remained in prison 16 years. The death of Ferdinand (1564) released him, but he was obliged to promise not to preach again.

AUGUSTA HISTORIA, the name given to a series of Roman biographers of the emperors from the accession of Hadrian (117) to the death of Carinus (385), the predecessor of Diocletian. The writers included in this collection are Ælius Spartianus, Julius Capitolinus, Ælius Lampridius, Valcatius Gallicanus, Trebellius Pollio, and Flavius Vopiscus of Syracuse. Some editors have included others, as Eutropius and Paulus Diaconus. There is a break in the *Augusta Historia* in the absence of the lives of Philippus, Decius, and Gallus. The Bipontine edition is the best.

AUGUSTA, Maria Louisa Catharine, empress of Germany and queen of Prussia, born in Weimar, Sept. 30, 1811. She is the daughter of the grand duke Charles Frederick of Saxe-Weimar (died July 8, 1853), and her mother (died June 23, 1859) was a daughter of Paul I., emperor of Russia. She was brought up at the court of her grandfather Charles Augustus, the friend of Goethe, who speaks in one of his letters of the "many-sided and harmonious culture of the princess Augusta." Her elder sister Maria married Prince Charles of Prussia, and she married the prince's brother, the present Emperor William, June 11, 1829. She attended personally to the education of her two children, the present crown prince and the princess Louisa, since 1856 grand duchess of Baden. She is much respected for her love of science, letters, and art, and for her benevolent disposition, displayed especially in 1870–'71 in labors for the relief of the wounded soldiers. In 1872 she founded at Charlottenburg a seminary for the education of orphan daughters of officers who fell in the war, and has designed buildings for the poor in Berlin after the plan of those of Mr. Peabody in London.

AUGUSTAN AGE, the Roman literary epoch which culminated in the reign of Augustus Cæsar. During this period Cicero, Horace, Ovid, Virgil, Catullus, Tibullus, and other writers flourished; also great patrons of literature like Mæcenas. The purest Latinity belongs to the authors of the Augustan age. In English literature it was common in the last century to apply the phrase "Augustan age of English literature" to the times of Addison, Steele, Swift, and Defoe, and the writers during the reign of Queen Anne. The *siècle d'Auguste* of French literature is the latter years of the reign of Louis XIV. This metaphor has no modern application beyond the literature of France and England.

AUGUSTENBURG, a village on the formerly Danish and now German island of Alsen; pop. about 500. It grew up round the palace of the same name, built in 1651 by Duke Ernst Gunther, and rebuilt in the latter part of the 18th century on a magnificent scale by Friedrich Christian the elder, duke of Schleswig-Holstein-Sonderburg-Augustenburg, whose son Christian August (born July 9, 1768, died May 28, 1810) was in 1810 adopted by the childless King Charles XIII. of Sweden, and was succeeded by Bernadotte as crown prince. The male lineage of the ancient royal Holstein-Denmark dynasty became extinct in 1863, and its female lineage has since been known as the Holstein-Sonderburg family, the present king of Denmark belonging to the junior or Schleswig-Holstein-Sonderburg-Glücksburg branch, and the dukes of Augustenburg to the senior or Schleswig-Holstein-Sonderburg-Augustenburg branch. Prominent among the latter was Christian Karl Friedrich August (born July 19, 1798, died March 11, 1869). His father was the duke Friedrich Christian the younger, and his mother was a daughter of Christian VII. of Denmark. He sold his hereditary estates to Denmark in 1852, and in 1863 relinquished his claims to the succession in the duchies of Schleswig and Holstein, which were unsuccessfully revived during the Schleswig-Holstein war by his elder son Friedrich Christian August (born July 6, 1829), who has since the annexation of his former possessions to Prussia chiefly resided in Gotha. His eldest son, August, was born in 1858.

AUGUSTI, Johann Christian Wilhelm, a German theologian, born at Eschenberg, in Gotha, about 1772, died in Coblentz in 1841. He studied at Jena, became professor of philosophy and oriental languages in that university, was appointed professor of theology in 1812 at Breslau and in 1819 at Bonn, and some years later was placed at the head of the ecclesiastical affairs of the Rhenish province of Prussia as director of the consistory of Coblentz. The most important of his numerous works is the *Denkwürdigkeiten aus der christlichen Archäologie* (12 vols. 8vo, Leipsic, 1817–'31). As an oriental scholar he was eminent. In doctrine he was an orthodox Lutheran.

AUGUSTIN, or **Austin, Saint,** archbishop of Canterbury, sometimes called the apostle of the English, born probably in the first half of the 6th century, died at Canterbury between 604 and 614. He was a Benedictine monk in the monastery of St. Andrew at Rome, when he was selected by Pope Gregory I. with other monks to convert the Saxons of England to Christianity. He landed in the dominions of Ethelbert, king of Kent, in 596 or 597, and was hospitably received and allowed to preach to the people, although the king himself firmly refused to forsake the gods of his fathers. The influence of his wife, a Christian princess, aided by the preaching of Augustin, finally prevailed, and Ethelbert was baptized, after which the efforts of the missionaries were crowned with complete success throughout the whole Saxon heptarchy. The ascetic habits of Augustin and his brethren, a reputation for miraculous power in the restoration of sight and even of life, the example of the king, and the fact that the southern races of Europe which had embraced Christianity were far before them in civilization and prosperity, made a deep impression upon the Saxon people, never very devotedly attached to their national religion,

and their conversion seems to have been general; it is said that 10,000 persons were baptized in a single day. Their temples were dedicated to the new faith and used as churches, and many of their rude festivals were converted into religious feasts, without losing their original social character. Augustin, it is said, allowed no coercive measures to be used in propagating the gospel. His success caused him to be appointed by the pope archbishop of Canterbury, with supreme authority over the churches of England. The see of York was soon afterward established, and a number of other bishoprics. Augustin wished to establish conformity of religious customs over the whole of Britain, and for that purpose appointed several conferences with the British bishops of Wales, who were successors of converts of the 2d century, and had declared their independence of the church of Rome. The conferences, however, failed of any result. A number of Welsh monks were soon after put to death, and Augustin has been charged with the deed, but on no very good authority. His relics were preserved in the cathedral at Canterbury.

AUGUSTINE (Aurelius Augustinus), **Saint**, a doctor of the Latin church, born at Tagaste, a small town of Numidia in Africa, not far from Carthage, Nov. 13, 354, died Aug. 28, 430. His father, Patricius, was a pagan nobleman of moderate fortune, while his mother, Monica, who has been canonized by the church, was an earnest Christian. Augustine was sent to the best schools of Madaura and Carthage. His own "Confessions" tell us that his conduct at this period of his life was far from exemplary. His studies, chiefly in the heathen poets, were more favorable to the development of his fancy and his style than to his Christian growth. The death of his father, which threw him upon his own resources, and the influence of some philosophical works, especially the *Hortensius* of Cicero, roused him to a diligent search after truth. Unable to find this in the writings of the Greek and Roman sages, and dissatisfied with what seemed to him the crude and fragmentary teachings of the Jewish and Christian Scriptures, he adopted the dualism of the Manichæans. At the age of 29 he went to Rome. There his reputation as a teacher of eloquence soon rivalled that of Symmachus, then at the height of his renown. On the recommendation of that orator, he was called to Milan as a teacher of rhetoric. Ambrose was then bishop of Milan, and Augustine's first care was to know so famous a preacher. After repeated interviews with Ambrose, the conversion of his own illegitimate son, and the entreaties of his mother, he resolved to embrace Christianity. The history of his conversion forms the most striking chapter in his "Confessions." After eight months of seclusion, which he spent with his mother and brother and son, preparing for his confirmation in the church, and maturing his plans for the future, Augustine in the Easter week of 387 was baptized, together with his son and brother, by the hand of Ambrose. He at once set out on his return to Africa. On the way his mother died, and a small chapel among the ruins of Ostia marks the traditional spot of her burial. The death of his son, which took place soon after his return, confirmed his inclination to the monastic life. He retired to Tagaste, and passed nearly three years in studious seclusion, varied only by occasional visits to the neighboring towns. On one of these visits, when he was present at the church in Hippo, a sermon which the bishop Valerius delivered, asking for a priest to assist him in his church, turned all eyes toward this famous scholar. No refusals were allowed, and Augustine was ordained. Preaching was soon added to his duties, an exception being made in his case to the usual rule, and the periods of the African orator, in harsh Latin or the harsher Punic tongue, were received with vehement applause. He was soon called to be assistant bishop, and then, on the death of the elder prelate, the whole charge of the church of Hippo was intrusted to his care. He retained the office until his death, a period of 35 years. The details of his episcopal life are minutely related by his friend Possidius. He preached every day and sometimes twice in the day; was frugal in his domestic arrangements, being a strict ascetic, and requiring of his attendant priests and deacons an equal simplicity of diet and dress; given to hospitality, yet without display; warmly interested in every kind of charity; courteous in his bearing, welcoming even infidels to his table; bold against all wickedness and wrong, whatever the rank of the transgressor; and untiring in his visits to widows and orphans, to the sick and the afflicted. He disputed with Manichæans, Arians, the followers of Priscillian, of Origen, and Tertullian, the Donatists, and the Pelagians, and allowed no doubtful utterance of doctrine to pass without his questioning. To his industry in controversy must be added his vast correspondence with emperors, nobles, doctors, missionaries, bishops, in every quarter of the globe, on questions of dogma, of discipline, and of policy—his solid works of commentary, criticism, morality, philosophy, and theology, and even his poetry, for to him are attributed several of the sweetest hymns of the Catholic anthology. The titles alone of the works of Augustine make a long catalogue. The single volume of "Sermons" contains nearly 700 pieces, shorter indeed and less ornate than the celebrated sermons of Basil and Chrysostom, but justifying Augustine's reputation for sacred oratory. The volume of "Commentaries on the Psalms" is more rich in practical remarks than in accurate learning. His remarks upon the "Four Gospels" are more valuable. His work on the "Care that should be taken for the Dead" contains some striking views concerning the relation of the living to disembodied souls. The volume of his "Epis-

tles" is remarkable, as illustrating his best style and the finest traits in his character. The name of Augustine, in the dogmatic history of the church, is best known in connection with the heresy of Pelagius; but his works which are most widely known are the "Confessions" and "The City of God." In the former, written just after his conversion, he gives a history of his life up to that time, not so much in its outward circumstance as in its inward experience and change. It has been translated into every Christian tongue, and is classed with the choicest memorials of devotion, both in Catholic and Protestant oratories. His treatise on "The City of God" (*De Civitate Dei*) is the monument of highest genius in the ancient church, and in its kind has never been surpassed. Its immediate purpose was to vindicate the faith of the gospel against the pagans, who had just devastated Rome. The first five books confute the heathen thesis that the worship of the ancient gods is essential to human prosperity, and that miseries have only come since the decline of this worship. The five following books refute those who maintain that the worship of pagan deities is useful for the spiritual life. The remaining twelve books are employed in setting forth the doctrines of the Christian religion, under the somewhat fanciful form of "two cities," the city of the world and the city of God. The influence of Augustine upon his own age, and upon all succeeding ages of Christian history, cannot be exaggerated. It is believed that he was at once one of the purest, the wisest, and the holiest of men; he was equally mild and firm, prudent and fearless; at once a philosopher and a mystic, a student and a ruler. Of his singular humility manifold instances are recorded. His severe self-discipline matches the strictest instances of the hermit life. In his "Retractations," begun after the close of his 70th year, he reviews his writings, taking back whatever is doubtful or extravagant, and harmonizing discordant opinions. The aid of a coadjutor relieved Augustine in his latter years of a portion of his responsibility; yet questions of conscience were constantly presented to him. When Genseric and his Vandals showed themselves on the coasts of Africa, the question was put to him if it were lawful for a bishop at such a season to fly and leave his flock. The answer which he made was illustrated by his own course. He calmly waited for the threatened approach, and when the fleet of the foe was in the bay of Hippo, and the army was encamped before the walls, exerted himself only to quiet the fears and sustain the faith of his brethren. He died of fever before the catastrophe. The bishop Possidius, who watched at his bedside, gives an edifying account of his last days, and of the grief of the people at his loss. His relics were transported to Italy, and mostly rest at present in the cathedral of Pavia. Within the present century the bone of his right arm has, with solemn pomp, been returned to the church of Bona in Algeria, which occupies the site of ancient Hippo.—The best edition of Augustine's works is that of the Benedictines, published at Paris and at Antwerp at the close of the 17th century, in 11 vols. folio. An edition in 11 volumes was also published in Paris in 1836–'9. An additional volume of sermons, before unpublished, found at Monte Casino and Florence, was published at Paris in 1842. An English translation by various hands has been undertaken at Edinburgh, under the editorship of the Rev. Marcus Dods, the 3d and 4th volumes of which appeared in 1872.

AUGUSTINIANS, or **Hermits of St. Augustine,** a religious order in the Roman Catholic church, which traces its origin to the great bishop of Hippo, and professes to have received its rule from him, although many Catholic writers dispute the fact. St. Augustine in the year 388, before his ordination, erected a kind of hermitage on a little farm belonging to himself near Tagaste, where with several friends he passed his time in seclusion. After he became a priest at Hippo he established a similar retreat in a garden presented to him by the bishop, and during his episcopate he had his clergy living with him in his house, under a kind of monastic rule. From these circumstances he has been looked upon as the founder and special patron of a certain class of religious communities, and many of their rules have been drawn from his writings. The present order of Hermits of St. Augustine was formed by uniting several societies previously distinct. This was done by Alexander IV. in the year 1256, and a rule was given them attributed to St. Augustine. In 1567 the Augustinians were enrolled among the mendicant orders. In England they were usually called Black Friars, from the color of their habit. There are several distinct branches of Augustinians whose rule is more severe than that of the principal body; they are governed by vicars general, who are subordinate to the general. Rome is the chief seat of the order. The number of convents in 1862 was 271, with about 4,000 members; but since then their number has been greatly reduced by the suppression of monastic orders in Italy. There is a large and beautiful church belonging to the Augustinians, with a convent adjoining, in Philadelphia; also a college, with a monastery and a well cultivated farm adjoining, at Villanova, Delaware county, Pa., about 15 m. from Philadelphia.—**Augustinian Canons** are a separate body of canons regular attached to the Lateran basilica and a few other churches.—Several religious orders of females belong also to the Augustinian family.

AUGUSTOWO. I. Formerly the N. E. government of the Russian kingdom of Poland. Its territory now forms the government of Suwalki and a part of Lomza. **II.** A city in the present government of Suwalki, from which the preceding government received its name, on a tributary of the Narew, near a considerable lake, and 140 m. N. E. of Warsaw; pop. in 1867,

9,364. It has an extensive trade in cattle and woollen and cotton goods. It was founded in 1560 by King Sigismund Augustus, from whom it was named.—The canal of Augustowo connects the Narew with the Niemen, making a continuous navigation between the upper Vistula and the mouth of the Niemen in the Baltic. It is 150 m. long and 5 to 6 ft. deep.

AUGUSTULUS, Romulus, the last Roman emperor of the West. He was placed on the throne A. D. 475, by his father Orestes, a native of Pannonia, who had been a favorite of the emperor Julius Nepos, but who at last succeeded in usurping the power of his patron, and conferring it upon his son. The young man was remarkable only for his weakness and the beauty of his person. On the defeat of Orestes by Odoacer at Pavia, and his subsequent execution (476), Augustulus was banished to the castle of Lucullus in Campania, where he received yearly 6,000 pieces of gold.

AUGUSTUS, Caius Julius Cæsar Octavianus (named at his birth simply Caius Octavius), first emperor of Rome, born at Velitræ, Sept. 23, 63 B. C., died at Nola, Aug. 19, A. D. 14. He was the son of Caius Octavius, a rich senator, who in 60 B. C. was appointed prætor of Macedonia, and of Atia, a daughter of Julia, the younger sister of Julius Cæsar. His father dying just after retiring from his prætorship, Octavius was educated in Rome at the wish of his mother, and afterward under the superintendence of Lucius Marcius Philippus, who became his stepfather. He soon attracted the notice of his great-uncle Julius Cæsar, who treated him as his own son, and by his will made him his principal heir. On March 15, 44, when the dictator was assassinated at Rome, Octavius was at Apollonia on the W. coast of Epirus Nova, pursuing his studies. The news of the murder and of his own adoption as heir reached him almost immediately. Against the warning of friends, he went at once to Rome, changing his name Octavius to Octavianus, and demanded his inheritance, which Mark Antony, who had possessed himself of the principal power in the state, after some hesitation was obliged to yield. Octavius, who was now universally known by the name of Cæsar, began a struggle with Antony for the control of Rome. Each tried every means to gain the favor of the people, Octavius was already beginning to gain the advantage, when Antony left Rome to secure for himself the legions in Cisalpine Gaul. Octavius took advantage of his rival's absence to win still further the popular favor, and was aided by the refusal of Decimus Brutus, prætor in Cisalpine Gaul, to give up that province to Antony. Cicero now came forward in Octavius's favor, thinking thus to advance the cause of a freer government. The senate, the people, and the soldiers were soon won. In January, 43, having received the rank of prætor and been appointed to the command of those troops whose good will he had secured, he went with the two consuls to the assistance of Decimus Brutus, whom Antony was besieging in Mutina (Modena). Antony was defeated and driven beyond the Alps. But the senate, dreading any increase of the power of the successful general, and relieved of their fear of Antony, now made a change of policy, appointed Decimus Brutus to the chief command of the army, and denied Octavius a triumph. The latter thereupon began to treat with Antony for a reconciliation and division of power, Antony having in the mean time allied himself with Lepidus and recrossed the Alps. First of all Octavius secured the consulship, which the senate was persuaded almost against its will to permit him to assume. He paid the people the sums left by the will of Cæsar, and secured for himself the command of an army to be sent against Brutus and Cassius, against whom a decree of outlawry was passed. Under the guise of moving first against Antony, Octavius marched his army into northern Italy and met Antony and Lepidus at Bononia (Bologna). Here an open reconciliation took place, and he formed with them the triumvirate, agreeing to merge his own power in this equal division of the empire among the three. The triumvirs returned to Rome immediately, though they entered the city separately. In the general proscription and massacre of their enemies which followed, Octavius displayed cruelty fully equal to that of his associates. After an unsuccessful attempt to take Sicily from Sextus Pompey, who had an excellent fleet, and with whom many Romans took refuge, Octavius and Antony turned their arms against Brutus and Cassius, whom they defeated at Philippi (42). On his return to Rome—Antony now being with Cleopatra in Egypt—Octavius found that Fulvia, Antony's wife, aided by Antony's brother, Lucius Antonius, had endeavored to excite popular feeling against him by declaring that a new proscription was about to begin, and by other means. Antonius had even assembled an army. Octavius put a speedy end to this revolt by taking Perusia (Perugia), where Lucius Antonius had fortified himself, and cruelly putting to death 400 Perusians as a sacrifice to the manes of Cæsar (40). Fulvia's death prevented a renewal of the war, and Octavius and Antony were reconciled at Brundusium, Octavia, Octavius's sister, being given in marriage to his fellow triumvir. Sextus Pompey, however, still held Sicily, the grain storehouse of Rome, and Octavius was obliged to bribe him by the offer of Sicily, Sardinia, Corsica, and the province of Achaia, to make peace and supply Rome with food. No sooner had Octavius thus secured Pompey than he began to seek for a pretext to recapture the provinces given him. Alleging that Pompey allowed piracy near his coasts, Octavius declared war against him (38). Antony at first refused his aid, but was persuaded by the mediation of Octavia, and sent a considerable fleet to join that of Octavius. After some vicissitudes, Agrippa, the commander of the navy, ended

the war by an overwhelming defeat of Pompey, who fled to Asia (36). Lepidus, the only one of the triumvirs who had actually succeeded in landing in Sicily, now aspired to the government of that island; but Octavius won over his troops, and he suffered himself to be called to Rome and consigned to submissive quiet by the appointment of pontifex maximus. Octavius now divided among his soldiers the lands taken from his enemies. He was received with the greatest honors at Rome, but, with his wonted hypocrisy, assumed a modest and liberal mien; he improved the city, and even talked of fully restoring the republican forms. But while gaining for himself the favor of the people, he steadily undermined the influence of his only remaining rival, Antony, whom he pretended to support. Much of his time in the two years that followed (35–34) was occupied in the suppression of revolts in various parts of the Roman provinces. The repudiation by Antony of his wife Octavia served to widen the breach between the triumvirs; and soon afterward the arrogant and dangerous assumptions of Cleopatra, who now held Antony as her complete slave, afforded Octavius the pretext he desired. Convincing the people of the dangerous designs of the Egyptian queen, he brought about a declaration of war, defeated her and Antony in the battle of Actium in September, 31, rapidly followed up this victory, and by the succeeding events, ending in the death of this only remaining opponent (30), he was left sole ruler of Rome, and celebrated his victories by a three days' triumph. He had some thought of laying aside his power, but in counsel with his friends Agrippa and Mæcenas, the advice of the latter prevailed, probably coinciding more nearly with his own wishes, and he kept his rulership. Rome was now in complete peace. Octavius, although himself supreme, reëstablished many of the old republican forms, and benefited the city by numerous wise measures. In his seventh consulship (27), he astonished the senate by proposing to lay down the chief power and to restore entirely the old order of things. The senators begged him to retain his position, and he, pretending great reluctance, consented. This ruse was several times repeated during his life. On Jan. 16, 27, he received from the Roman people and the senate the name Augustus (the venerated or sanctified), and by this title he was generally known from this time forth. Within the next few years the powers of tribune, pontifex maximus, and of many other magistrates, were gradually assumed by Augustus, with the consent of the senate, and he became finally the absolute ruler of the empire. In 26 and 25 he established order in Spain, defeating the rebellious Astures and Cantabri, who, however, afterward revolted, and were not finally subdued till 19. In 21, after four years spent at Rome, during which several conspiracies had been discovered against his life, he visited Sicily and the eastern part of the empire, establishing order everywhere. He left Agrippa, who married his daughter Julia, as governor of Rome in his absence. During this journey he visited Athens and Samos. In 20 he made a treaty with the Parthians, by which they peacefully restored standards and captives taken from Crassus (53) and Antony (36). In 16 he went to Gaul, where he remained three years, and established many colonies. Agrippa died in 12, leaving two sons, who had been adopted by Augustus and called Caius and Lucius Cæsar. Within the year Julia was married again to her stepbrother Tiberius, the son of the crafty Livia, who in this year also was sent against the Pannonians and defeated them. In 10 Augustus went again to Gaul, and at the same time sent his stepson Drusus, the younger brother of Tiberius, against the western German tribes. Drusus conquered them, but was killed by an accident, and Augustus pronounced his funeral oration in the senate (9). In 8 B. C. the senate flattered Augustus on his victories by naming after him the month of August, before called Sextilis. A short time after this Augustus sent into exile his daughter Julia, whose dissolute life had become an open scandal. Her two sons had now assumed the *toga virilis*, and were looked upon as the heirs of the emperor. But Lucius died at Massilia in A. D. 2, and Caius in Lycia in 4; and Augustus, upon whom these family misfortunes made a deep impression, adopted Tiberius, thus fulfilling the desire of Livia, and sent him to conduct a campaign against the Germans. Tiberius was victorious, but in the year 9 the overwhelming defeat of the Roman general Varus by Arminius lessened the value of these conquests. A period of peace now followed, and Augustus turned his attention to the affairs of the city, which he administered wisely and with the popular favor. In 14 his health suddenly declined, and just after taking the census, the third during his administration, he died at Nola, whither he had gone on account of his illness.—The period of Augustus is one of the most important in Roman history. In it flourished those men who have caused it to be named the "Augustan age of literature"—Catullus, Cicero, Virgil, Horace, Ovid, Tibullus, the great patron of art and letters Mæcenas, and others. Augustus himself wrote several works, of which only fragments remain. These have been collected, and a good edition of them was published by Weichert (Grimma, 1841). The emperor's rule was most beneficial to the city. He boasted that he had found it of brick and left it of marble. He encouraged all useful arts, and his laws in matters of municipal government were generally admirable. In person Augustus was of middle height, with a well knit and fine figure, and a quiet face, with much dignity and firmness of expression. His hair was light, his eyes large and clear. In his character the crafty traits predominated, but he displayed in

the latter part of his life much generosity.—See the life of Augustus in Suetonius, Plutarch's life of Antony, and the histories of Arnold, Merivale, and Ihne.

AUGUSTUS I. (as king, II.) **FREDERICK,** surnamed the Strong, elector of Saxony and king of Poland, second son of the elector John George III., born in Dresden, May 12, 1670, died in Warsaw, Feb. 1, 1733. After a careful education he visited all the countries and courts of Europe, Rome alone excepted. During these journeys he began the collection of pictures and other objects of art composing the gallery in Dresden, which, increased by his son, became one of the most celebrated in Europe. After the death of his father in 1691, and of his elder brother, John George IV., in 1694, he became sovereign of Saxony; and after the death of John Sobieski, king of Poland, in 1696, he was elected as his successor by the nobility of that country. To obtain this election he changed his religion from Protestantism to Catholicism. To restore to Poland some provinces wrested by Sweden, Augustus attacked Charles XII. jointly with Denmark and with Peter the Great of Russia; but after a long struggle, in which both Poland and Saxony suffered terribly, he was obliged at the bidding of Charles XII. to give up the royal crown, which the victor gave to Stanislas Leszczynski (July 12, 1704), and to give his own consent formally to this act, in the peace of Altranstädt (Sept. 24, 1706). When Charles was defeated at Poltava, July 8, 1709, Augustus renewed his alliance with Peter the Great, broke the peace with Sweden, entered Poland with an army, expelled Leszczynski, and recovered the crown. His reign was one of great luxury and splendor, his court a scene of uninterrupted festivity, with artists, adventurers, alchemists, and numberless beautiful women, one of whom, the celebrated Countess Königsmark, was by Augustus the mother of that Maurice so celebrated at the court of Versailles and in the history of France under the name of Marshal Saxe. Augustus was elegant, affable, and of extraordinary bodily strength, but without any trait of real excellence. He impoverished Saxony and corrupted Poland.—**Augustus II.** (III.) **Frederick,** son of the preceding, born in 1696, died Oct. 5, 1763. He succeeded his father in both Saxony and Poland, in the first by inheritance, in the second by election, though he was opposed by Stanislas Leszczynski, whose claims were supported by Louis XV. and a portion of the Polish nobles. Augustus continued the gorgeous reign of his father, his greatest passion being hunting and festivities. His reign over Poland was quiet, but in every respect demoralizing. Count Brühl, his favorite, ruled in the sovereign's name. Augustus, being married to an Austrian princess, had no other policy than subserviency to Austria, and he became entangled in the wars against Frederick the Great of Prussia. In 1742 he concluded an alliance offensive and defensive with Maria Theresa, and promised afterward to bring into the field 50,000 men. This army, united with the Austrians, was beaten at the battle of Hohenfriedberg in Silesia, June 4, 1745, when Frederick invaded Saxony and entered Dresden, while Augustus fled to Poland, which was at peace with Prussia. By a treaty concluded at the close of the same year he was restored to his electorate. In the seven years' war, however, Augustus, as elector of Saxony, again participated on the side of Austria. At the beginning his Saxon army was compelled to surrender to Frederick (October, 1756), and he himself fled to Warsaw, persisting in his alliance with Austria, and resided there until the pacification by the treaty of Hubertsburg (1763), when he returned to Dresden.

AUGUSTUS FREDERICK, prince of Great Britain and Ireland, duke of Sussex, the 6th son of George III. of England, born in Buckingham palace, Jan. 27, 1773, died in Kensington palace, April 21, 1843. He studied at Göttingen, and subsequently travelled in Italy. While at Rome in 1793 he married Lady Augusta Murray, daughter of the Catholic earl of Dunmore; but as there were some doubts as to the validity of the marriage, the wedding ceremony was repeated in London, Dec. 5, 1793. This marriage was annulled, however, by the prerogative court of Canterbury, as contrary to the act 12 George III., cap. 3, which declared that no descendant of George II. should marry without the consent of the crown. Lady Augusta separated from the duke immediately after the publication of this sentence, having borne him a son and daughter, who took the name D'Este. In 1801 the prince was made a peer, and received a parliamentary grant of £12,000 per annum, which was subsequently increased by the addition of £9,000. In the house of lords the duke took the liberal side on most public questions, as the abolition of the slave trade, Catholic and Jewish emancipation, the reform bill, and free trade. In 1810 he was elected grand master of the freemasons; in 1816, president of the society for the encouragement of the useful arts; and in 1830, president of the royal society. He was a munificent patron of literature and art, and possessed one of the finest libraries of England. His liberal opinions in politics, and the part which he took in favor of Queen Caroline, made him unpopular at court, but before the death of George IV. a reconciliation took place between them.

AUK, the name of certain sea birds of the family *alcadæ*, including the subgenera *alca*, *fratercula*, *mergulus*, and *phaleris*. The true auks (*alca*) are strictly ocean birds, and scarcely ever leave the water, except to build their nests and breed in immense flocks in caverns and crannies of rocks, laying one disproportionately large egg. The young are fed from the crops of their parents, even after they can move about freely and shift for themselves. This genus contains but two species, the great auk

and the razor bill. The former (*A. impennis*, Linn.) is remarkable for the imperfect development of its wings, which are totally unfit for flying. They are set very far back on the body, and not much more than rudimental; but they are used by the bird as oars, and in conjunction with its feet it plies them with such power and velocity that it has been known to escape from a six-oared barge pulled by vigorous oarsmen. It rarely leaves the arctic circle and the waters adjoining, nor is it often seen off soundings, but dwells in great numbers about the Farö islands and Iceland, and it has been asserted that it breeds in Newfoundland. In summer all the upper parts of this bird's plumage are of a deep sooty black, which is changed in winter to white on the cheeks, the sides of the neck, and the throat. It breeds in June and July, and lays one large yellowish egg, as big as a swan's, irregularly dashed with black marks, which have been compared to Chinese characters. It has a large decurved

Great Auk (Alca impennis).

bill with sharp cutting edges; and its feet being situated at the extremity of its body, it stands or sits erect, propped up by its short stiff tail, after the manner of the penguins, which it not a little resembles.—The black-billed auk, razor bill, or murre (*A. torda*, Linn.) belongs to the northern latitudes, in the extreme height of which these birds swarm in multitudes during the breeding season, affording food and clothing to the Esquimaux, who place on them their chief dependence. The bill of the black auk has a sharp hook at its extremity, and a denticulated process at about two thirds of its length, which is of great use in securing its slippery prey. Its general color is dusky above and white below; it flies sufficiently well, but, like the species last described, uses its wings as oars in diving, which it does to perfection. It is very abundant on all the rocky coasts of Great Britain, where it sits in long horizontal rows on the steps or ledges of the crags, towering one above the other.—The genus *fratercula* consists of a single species, the Labrador auk, common puffin, or coulterneb (*F. arctica*), this last name being admirably descriptive of its strong massive beak, the mandibles of which, when separated, especially the upper one, almost exactly resemble the coulter of a plough. The upper parts of this bird are dusky, its cheeks and belly white. It has a black collar, legs and feet orange, beak broad, cutting-edged, bluish gray next to the head, but scarlet thence to its obtuse point. Although it extends to the high arctic regions, it is in England only a summer visitor, breeding in the low sandy islands in rabbit burrows, of which it dispossesses their legitimate owners; or, where there are no rabbits, burrowing itself. In rocky places, as Dover cliffs, Flamborough head, and the Bass rock, at all which places these birds abound, they lay their single egg in the crevices of the rocks. When they have reared their young, they pass from England to the southern coasts of France and Spain, where they winter. Their burrows are curiously excavated, by means of their bills, to the depth of two or three feet, and often have two entrances for escape in case of surprise. The length of the puffin is about 12 inches.—The *mergulus* has likewise but one representative, the little auk, common rotche, or sea dove (*M. melanoleucos*), which is the smallest of the family, and a native of the very highest latitudes, congregating in large flocks near the arctic circle; Greenland, Spitzbergen, and Melville island being its favorite stations. Its plumage is black and white; and in winter the front of the neck, which is black in summer, turns white. It lays but a single egg, of pale bluish green, on the most inaccessible ledges of the precipices which overhang the ocean. It is about 9 or 10 inches long.—The last division, *phaleris*, contains also but a single species, the paroquet auk (*P. psittacula*), an extreme northern bird, about 11 inches long. Its head, neck, and upper parts are black, blended into ash color on the forward parts of the neck; the breast and belly white; the legs are yellowish, the beaks in the adults red. This bird swims and dives admirably, and is said to be of a singularly unsuspicious character, and easily captured. About midsummer it lays one large egg, nearly of the size of a hen's, with brown or dusky spots, on a whitish or yellowish ground.

AULAF, or **Aulaf,** a name borne by several Northumbrian kings of Danish origin, about the second half of the 10th century. **I.** A Northumbrian petty king and a pagan, died in 980. His family having been expelled from Northumbria by Athelstan, he fled into Ireland, fought against the native tribes in that island, in 937 endeavored to recover Northumbria, but was repulsed by Athelstan, returned to Ireland, and ravaged Kilcullen. After the death of Athelstan, Northumbria fell away from the English crown, and Aulaf recovered his inheritance after defeating Edmund at Tamworth and Leicester. Edred, the Eng-

lish king, successor of Edmund, made him do homage and embrace Christianity. In 952 Aulaf was driven out by the Christian Northumbrians, and, tired of struggling against the English, he went over to lead the Ostmen of Dublin against the Irish. He defeated Murdoch, king of Leinster, in 956, and put him to death the next year. Two more Leinster princes suffered the same fate in 977. At this time he called himself king of Ireland and the Isles. In 980 Aulaf lost his son and heir, Reginald or Regnell, in an engagement against the Hibernian aborigines, and in the same year, heart-broken, he went on a pilgrimage to Iona, where he died, after a stormy life. **II.** Son of Guthfrith, and uncle of the preceding, lived in the latter half of the 10th century. He joined in the wars of his nephew against the Saxons in south Britain and the Celts of Erin. He ravaged Armagh in 932, and Kilcullen in 938. In 939 he was obliged to shut himself up in Dublin. He made an irruption into England with his nephew, conquered Edmund, the successor of Athelstan, in 943, and recovered Northumbria. He lived and died a pagan and a hater of the Christian clergy.

AULIC COUNCIL (Lat. *aula*, a court or hall; Ger. *Reichshofrath*), a tribunal under the old German empire, standing at its first institution next in authority to the supreme imperial chamber (*Reichskammergericht*), to which it was afterward made equal in power. It was formed in 1501 by the emperor Maximilian, chiefly from members of his tribunal for the administration of justice in the Austrian dominions, and, as ultimately organized, consisted of a president, vice president, and 18 councillors, all appointed and paid by the emperor. The authority of the aulic council was confirmed at the peace of Westphalia, made equal to that of the chamber, and sharply defined in the decrees concerning it (*Reichshofraths-Ordnungen*) of 1559 and 1654. Six of the councillors must be of the Protestant religion, and the unanimous vote of these six could not be entirely overruled by the others, no matter what their majority. The council was divided into two sections, one of nobles (*Grafen und Herren*), the other of legal scholars or experts (*Gelehrte*), all equal in rank, though the last named class received higher salaries than the others. The vice chancellor appointed by the electorate of Mentz also had a seat in the council. This tribunal had exclusive jurisdiction over feudal affairs connected with the empire, appeals in criminal cases in the states immediately subject to the emperor, and questions concerning the imperial government itself. The members of the council held office, except in extraordinary cases, during one reign; each emperor, immediately on his accession, appointing new ones. The council passed out of existence with the old German empire itself in 1806.

AULIS, in ancient geography, a town of Hellas, in Bœotia, situated on the strait of Euripus, which separates Bœotia and Eubœa; it had a temple of Diana. Here Agamemnon assembled his fleet preparatory to crossing the Ægean sea to Troy, and here his daughter Iphigenia was presented as a sacrifice to Diana. In the time of Pausanias only a few potters inhabited it.

AULNAY DE CHARNISÉ, Charles de Menou, seigneur d', a French proprietor, who figured largely in the history of Acadia or Nova Scotia, died in 1650. He was sent out about 1632 by Commander Isaac de Razilly, the proprietor of Acadia, and on his death acted as agent for his brother Claude de Razilly, whose rights he purchased in 1642. A civil war broke out soon after between him and La Tour, a neighboring proprietor, in which both parties committed excesses, and both sought the aid of New England. D'Aulnay secured the favor of the French government, and, after capturing Madame de la Tour in her fort in 1645, was appointed governor. His authority extended to the Kennebec. His widow, Jeanne Motin, married his old rival La Tour.

AUMALE (formerly *Albemarle*), a town of France, in the department of Seine-Inférieure, 40 m. N. E. of Rouen; pop. in 1866, 2,929. In 1592 a battle was fought here between the French and the Spaniards, in which Henry IV. was wounded. In the beginning of the 16th century Aumale was a county belonging to Claude de Lorraine, 5th son of René II., duke of Lorraine, who was afterward created duke of Guise by Francis I. of France, and became the head of the illustrious family of that name. It was raised to the rank of a duchy by Henry II., and held as such by Claude II., 3d son of Claude I., and brother of the celebrated Francis of Guise. This duke of Aumale distinguished himself during the war of the French against the emperor Charles V., was one of the promoters of the St. Bartholomew massacre, and was killed by a cannon ball before La Rochelle in 1573. His son Charles de Lorraine fought against Henry IV., assisting the duke of Mayenne in the battles of Arques and Ivry, where the troops of the league were defeated.—The title of duke of Aumale, after being extinct for years, was given to Henri Eugène Philippe Louis d'Orléans, 4th son of Louis Philippe, born in Paris, Jan. 16, 1822. Like his brothers, he was educated at one of the public colleges of Paris. In 1839 he was appointed captain in the 4th regiment of the line; he took part in the African expedition of Médéah, served a second campaign in Algeria, and returned to France in 1841 on account of ill health. While entering Paris, Sept. 13, 1841, at the head of the 17th regiment, of which he had been appointed colonel, a man of the name of Quenisset discharged a gun at him, but missed his aim. In 1842 he was made brigadier general, and commander of the district of Médéah. On May 16, 1843, he attacked and routed Abd-el-Kader, and as a reward was made lieutenant general and commander of the province of Constantine.

In 1847 he was appointed governor of Algeria in place of Marshal Bugeaud, and soon afterward received Abd-el-Kader's surrender. In 1848, on hearing of the revolution in Paris, he exhorted the population to wait calmly for further developments; and on March 3 he resigned and joined the other members of his family in England. On the outbreak of the Franco-German war in 1870 he offered his services to the government, but they were not accepted. After the downfall of Napoleon III. he returned to France, and in 1872 took his seat as a member of the national assembly. His eldest son, prince de Condé, died in Australia in 1866, aged 21, and his wife, a Neapolitan princess, in 1869. His only remaining child, the duke de Guise, born Jan. 5, 1854, died in Paris, July 25, 1872. He inherited a large fortune from the Condé family. In 1872 he was elected a member of the French academy. Besides pamphlets and articles on political and military matters, he is the author of *Histoire des princes de Condé* (2 vols., Paris, 1869), translated into English by the Rev. R. Brown-Borthwick (2 vols., London, 1872).

AUNGERVYLE, Richard (known in history as Richard de Bury), an English statesman and bibliographer, born near Bury St. Edmunds in 1287, died at Bishop's Auckland, April 24, 1345. He was educated at Oxford, appointed tutor of the prince of Wales, and after the accession of his pupil to the throne as Edward III. received successively the appointments of coiffeur to the king, treasurer of the wardrobe, and keeper of the privy seal. In 1333 he was consecrated bishop of Durham. In 1334 he succeeded Archbishop Stratford as lord high chancellor of England, which office he resigned in 1335 for that of treasurer. He went several times abroad as ambassador, once to Rome and thrice to Paris. Aungervyle was a diligent purchaser of rare and costly books, and when bishop of Durham his collection was one of the largest in England. He founded also for the use of the students at Oxford a library, which was then the best in the kingdom. The latter part of his life he gave up entirely to books. He left a Latin treatise on bibliography (the earliest by any English writer), entitled *Philobiblon* (Cologne, 1473; English translation by J. B. Inglis, London, 1832); *Epistolæ Familiarium*, including some letters to his friend Petrarch; and *Orationes ad Principes*.

AURELIAN (Lucius Domitius Aurelianus), a Roman emperor, born in Pannonia, or according to some authorities on the southern confines of Dacia, in the early part of the 3d century, assassinated between Heraclea and Byzantium, A. D. 275. His parents were poor and of the lowest class. He entered a Roman legion at an early age, and by his bravery and the remarkable feats of arms which his almost gigantic stature and great strength enabled him to perform he secured rapid promotion, and great personal popularity with the soldiers, among whom he was designated as *Aurelianus manu ad ferrum* (Aurelian Sword-in-Hand). He distinguished himself under Valerian and Claudius II. in campaigns against the Goths; and when Claudius died, although his brother Quintillius assumed the purple as his heir, Aurelian was proclaimed emperor by the army of the Danube, of which he was then in command (270). Quintillius committed suicide after a nominal reign of several weeks, and Aurelian took the throne without opposition. He drove the Goths beyond the Danube, carried on successful campaigns against the Alemanni and other German tribes, and to protect Rome against them built a line of strong walls, the ruins of which may still be traced about the city. He next undertook a war against Palmyra, then a magnificent city in the height of its prosperity, ruled by Zenobia, the widow of King Odenathus. He captured the city after one of the ablest defences in history, treated the people with comparative kindness, and refused to put Zenobia to death, though his troops demanded her execution. After his departure the Palmyrenes rose and massacred the Roman garrison; upon this he returned, destroyed the city, and put the people to the sword (273). Zenobia was carried to Rome, and appeared in the emperor's triumph. Aurelian next defeated an attempt at rebellion made by the Egyptians under their Roman governor. Tetricus, who had made himself the independent ruler of the greater part of Gaul, now surrendered after little more than the threat of a war; and the Roman empire resumed something of its old territorial importance. The senate bestowed upon Aurelian the title of "restorer of the empire." After effecting many improvements in the government of the city, the discipline of the army, and the condition of the people, the emperor was murdered while on the way to a campaign against the Persians, by his secretary, whom he had offended by some harsh treatment long before.

AURELIUS, Marcus. See Antoninus.

AURELLE (or **D'AURELLE**) **DE PALADINES,** a French soldier, born in 1803. He distinguished himself in the Crimean war. Before the outbreak of the war with Germany in 1870 he was commander of the 5th military division of France, at Metz. After the fall of the empire he was charged by the provisional government at Tours with the formation of the army of the Loire. After a battle near Coulmiers, he drove Gen. von der Tann from Orleans (Nov. 9–10), winning the first French victory over the Germans. For this he was appointed (Nov. 15) commander-in-chief of the army of the Loire. On Nov. 28 he attacked the left wing of Prince Frederick Charles at Beaune-la-Rolande, but encountered a severe repulse. On Dec. 2 he was beaten by the grand duke of Mecklenburg at Artenay, and on Dec. 3 Frederick Charles drove him back to the forest of Orleans, renewing the attack the next day and taking possession of the town at midnight, after brisk fighting.

On the same day the French had been thoroughly routed by another detachment of Frederick Charles's army near Chevilly and Chilleurs, and driven either across or along the Loire above Orleans, thus splitting the army of the Loire into two portions. D'Aurelle was removed from his command. He refused the command of the camp of Cherbourg, as well as the appointment of successor to Gen. Chanzy. As member of the national assembly at Bordeaux he opposed the continuation of the war, and was one of the committee of fifteen appointed to assist Thiers and Favre in arranging the preliminaries of the treaty of peace. He became commander-in-chief of the national guard of the department of the Seine, and in 1872 a member of the court martial for the trial of Marshal Bazaine.

AURICH, a town of Germany, in the Prussian province of Hanover, capital of an administrative division of the same name, and formerly capital of the principality of East Friesland, 60 m. N. W. of Bremen; pop. in 1871, 4,261. It has a castle which was formerly the residence of the prince of East Friesland, a college (gymnasium), and a normal school.

AURIFABER, the Latinized name of JOHANN GOLDSCHMIED, or GOLDSCHMIDT, one of the companions of Luther, born near Mansfeld in 1519, died at Erfurt in 1579. He studied at Wittenberg, and became Luther's amanuensis in 1545. In the Smalcaldic war he was chaplain to a Saxon regiment, and in 1551 court chaplain of the elector of Saxony, but he became involved in theological disputes and was removed in 1562. He collected the unpublished manuscripts of Luther, and was one of the collaborators of the Jena edition of the reformer's works. He edited the *Epistolæ Lutheri* and the "Table Talk." In 1566 he became pastor at Erfurt.

AURILLAC, a town of southern France, capital of the department of Cantal, in a valley on the Jourdanne, here spanned by a fine bridge, about 60 m. S. by W. of Clermont; pop. in 1866, 10,998. It is well built, with wide streets, kept clean by the overflowing of a large reservoir, into which two fountains discharge. The old buildings include the castle of St. Stephen, the church of St. Géraud, the church of Notre Dame of the 13th century, and the college, which contains a valuable library and a cabinet of mineralogy. The manufactures are copper utensils, jewelry, woollen stuffs, blondes, laces, and paper.—Aurillac was founded in the 9th century. The wall formerly surrounding it has been destroyed. The town suffered much in the wars of the 14th, 15th, and 16th centuries.

AURIOL, a French borough in the department of Bouches-du-Rhône, 16 m. N. E. of Marseilles; pop. in 1866, 5,182. It has manufactories of flags, and near it are coal mines.

AURIVILLIUS, Karl, a Swedish orientalist, born at Stockholm in 1717, died in 1786. He mastered the Syriac, Arabic, Sanskrit, and other oriental languages. After 1754 he resided at Upsal, at first giving private instruction in the poetry of different nations, and in 1772 was appointed professor of oriental languages in the university. He succeeded Linnæus as member of the academy of sciences in Upsal, and was an active member of the commission for preparing a new translation of the Bible into Swedish.

AUROCHS, the *bos bison* of Europe, one of the contemporaries of the mammoth (*elephas primigenius*), an animal of the ox family, once abundant, but now existing only in the forests of Lithuania belonging to the czar of Russia, and possibly in the Caucasus. It would long ago have become extinct but for the protection of man. The ure-ox (*B. urus* or *B. primigenius*), found in the post-tertiary deposits, is

believed to be the same as was described by Cæsar in his Commentaries as abounding in the forests of Gaul; it existed in Switzerland as late as the 16th century. Both species are found abundantly in the post-tertiary of Europe, and corresponding species in America, and no doubt furnished a large share of the food of prehistoric man.

AURORA (in Greek, Eos), the goddess of the morning, was the daughter of Hyperion and Thia, the wife of Astræus, and the mother of the winds. She carried off Orion to the island of Ortygia, and detained him there till he was slain by Diana. She bore away Cephalus, and had by him a son named Phaëthon. To Tithonus, son of Laomedon, king of Troy, she bore Memnon and Æmathion. Aurora is sometimes represented in a saffron-colored robe, with a wand or torch in her right hand, emerging from a golden palace, and ascending her chariot; sometimes in a flowing veil, which she is in the act of throwing back, opening the gates of morning; and sometimes as a nymph, wearing a garland and standing in a chariot drawn by winged horses, with a torch in one hand and flowers in the other, which she scatters as she goes.

AURORA, a city of Kane county, Ill., on Fox river and the Chicago, Burlington, and Quincy railroad, 40 m. W. by S. of Chicago; pop. in 1860, 6,011; in 1870, 11,162. It contains 14 churches, a handsome city hall, a college, and many important manufactories, the power for which is furnished by the Fox river. The construction and repair shops of the railway situated here employ about 700 men. A semi-weekly newspaper, and 3 weeklies, one of which is German, are published here.

AURORA BOREALIS (more correctly *Aurora Polaris*, since the phenomenon is not confined to northern latitudes), called also NORTHERN STREAMERS and NORTHERN LIGHTS, a luminous appearance, associated with energetic disturbances of the earth's magnetism and electrical condition. It is seldom seen save in high latitudes, though occasionally the tropics are visited by auroral displays. In polar regions auroras are very common, and usually far more brilliant than in the temperate zones. Humboldt gives the following description of the appearances presented when the auroral phenomena are fully developed, although it must be understood that there is considerable variety in these displays: "An aurora borealis is always preceded by the formation of a sort of nebular veil which slowly ascends to a height of four, six, eight, or even to ten degrees. It is toward the magnetic meridian of the place that the sky, at first pure, commences to become brownish. Through this obscure segment, the color of which passes from brown to violet, the stars are seen as through a thick fog. A wider arc, but one of brilliant light, at first white, then yellow, bounds the dark segment. Sometimes the luminous arc appears agitated for entire hours by a sort of effervescence and by a continual change of form, before the rising of the rays and columns of light, which ascend as far as the zenith. The more intense is the emission of the polar light, the more vivid are its colors, which from violet and bluish white pass through all the intermediate shades to green and purple red. Sometimes the columns of light appear to come out of the brilliant arc mingled with blackish rays similar to a thick smoke. Sometimes they rise simultaneously in different parts of the horizon; they unite themselves into a sea of flames, the magnificence of which no painting could express, and at each instant rapid undulations cause their form and brilliancy to vary. Motion appears to increase the visibility of the phenomenon. Around the point in the heavens which corresponds to the direction of the dipping needle produced, the rays appear to assemble together and form a boreal corona. It is rare that the appearance is so complete and is prolonged to the formation of the corona; but when the latter appears, it always announces the end of the phenomenon. The rays then become more rare, shorter, and less vividly colored. Shortly nothing more is seen on the celestial vault than wide, motionless nebulous spots, pale or of an ashen color; these disappear while the traces of the dark segment whence the phenomenon originated remain still on the horizon." Although auroras are more commonly seen in high latitudes than near the tropics, it is not toward the true poles of the earth that the increase takes place, nor does the increase continue after certain high latitudes have been reached. Thus the frequency of auroras is different at different stations in the same latitude; and in passing poleward from places in a given latitude, the region of maximum frequency is reached more quickly in some longitudes than in others. Thus an inhabitant of St. Petersburg would have to travel to lat. 71° N. before reaching the place of greatest auroral activity; while an inhabitant of Washington need travel northward only to lat. 56° to reach the region where auroral displays are most frequent. The zone on the earth's northern hemisphere where auroras occur most commonly and attain their greatest splendor, may be represented by constructing a ring of card or paper, of such dimensions as to agree with the 60th parallel of north latitude, and then pushing the ring southward on the side of America and northward on the side of Asia, until it passes through the most southerly part of Hudson bay and the most northerly part of Siberia. The position of the corresponding zone in the southern hemisphere has not yet been determined; but it is believed that the southern zone of maximum auroral frequency is nearly antipodal to the northern zone. From what we know of the connection between the occurrence of auroras and disturbances of the earth's magnetism, we have every reason to believe that as the magnetic poles of the earth are slowly shifting, so the zone of maximum auroral frequency must also change in position. It cannot be doubted, for example, that in the 17th century, when the northern magnetic pole lay between England and the north pole, terrestrial conditions were more favorable for the occurrence of auroras in England than they now are, or than they then were in corresponding latitudes in North America. At present, on the contrary, the northern magnetic pole lies between the north pole and the northwestern extremity of the American continent; hence auroras are more frequent and more brilliant in North America than in corresponding latitudes in Europe.—To the description given by Humboldt we should add that sometimes in high latitudes, instead of extending from the horizon, the auroral arch appears in the form of a complete oval. Hansteen relates that at Christiania he twice saw the auroral arch in this form. Sometimes more than one arch has been seen. Thus the observers who were sent by the French government to winter at Bossekop in Finland, saw on one occasion no fewer than nine arches, separated by dark spaces, "and resembling in their arrangement magnificent curtains of light, hung behind and below each other, their brilliant folds stretching com-

pletely across the sky." The position of the luminous region is not known. Arago was of opinion that each observer sees his own aurora, somewhat as each observer of a rainbow sees the luminous arc differently placed. Sir John Herschel says "no one can doubt that the light of the aurora originates nowhere but in the place where it is seen." But it has been considered that the most favorable conditions for the determination of the height of auroral gleams are presented when the auroral corona is formed. Now this corona always surrounds the point toward which the magnetic dipping needle points. Yet the magnetic dipping needles at different stations are not directed toward one and the same point; so that whatever the auroral corona may be, it does not seem to hold a definite place, in such sort that its distance can be determined by simultaneous observations; for it is the essential principle of the method of simultaneous observations that the lines of sight should be directed to one and the same point. Nor is it easy, on Herschel's theory, to interpret the fact that the auroral corona has been seen at stations distant more than 1,000 miles from each other, and always around the part of the heavens pointed to by the magnetic dipping needle. For a point immediately overhead at one station, and 100 miles from the earth's surface, would be below the horizon of a station 1,000 miles distant. We seem forced to adopt the conclusion that though there is no analogy whatever between the aurora and the rainbow, yet Arago was right when he asserted his belief that as each observer sees his own rainbow, so each observer sees a different aurora. We should thus be led to consider whether the nature of the luminous emanations—the direction, for instance, of the luminous flashes composing them —may not explain the formation of the auroral corona. In this case the position of the observer would affect the appearance of the phenomenon. —If we assume that reliance can be placed on the observations by means of which the height of the auroral arch has been estimated, we must assign a considerable elevation to many of these lights. On Oct. 17, 1819, an aurora was observed simultaneously at Gosport, Keswick, and Newtown Stewart, in Great Britain; and from the calculations made by Dalton the meteorologist, the arch was estimated to be 101 or 102 miles above the earth. More recently Sir John Herschel estimated that the arch in the aurora of March 9, 1861, was 83 miles above the earth. But he remarks that "the auroral light has been seen below the clouds, as in the polar seas by Parry, Sherer, and Ross, on Jan. 27, 1825; near the chain of the Rocky mountains on Dec. 2, 1850, by Hardisty; and at Alford in Scotland on Feb. 24, 1842, by Farquharson; nay, even habitually seen as if hovering over the Coreen hills in the last-mentioned neighborhood, at a height of from 4,000 to 6,000 miles." Herr Galle, from observations made during the aurora of Feb. 4, 1872, estimates the height of the auroral corona on that occasion at 265 miles above the sea level. Prof. Olmsted's conclusion that the auroral arch is seldom below 70 miles in height or above 160 miles, would thus appear to be negatived. But probably all such estimates must be abandoned, and "our meteorological catalogues," as Arago advised, "must be disencumbered of a multitude of determinations of height, though due to such great names as Mairan, Halley, Krafft, Cavendish, and Dalton."—The extent of the earth's surface over which the same aurora has been visible has sometimes been remarkable. Kämtz mentions that on Jan. 5, 1769, a splendid aurora was seen simultaneously in France and in Pennsylvania; and that the remarkable aurora of Jan. 7, 1831, was seen from all parts of central and northern Europe, in Canada, and in the northern parts of the United States. But even these instances, and others of the same kind which might be cited, are surpassed in interest by the circumstance that auroras of great brilliancy occur simultaneously over the major part of both the northern and southern hemispheres. Kämtz mentions that when Capt. Cook's observations are analyzed, it appears that on every occasion when he observed an aurora australis an aurora borealis had been seen in Europe, or else the agitation of the magnetic needle proved that around the northern magnetic pole an auroral display must have been in progress. The aurora of Feb. 4, 1872, was seen not only in America and Europe, and over the northern hemisphere generally, as far S. as lat. 14° N., but in Mauritius, in South Africa, in Australia, and probably over the greater part of the southern hemisphere (for Mauritius is much further north than southern auroras are ordinarily seen). —Mairan and Cassini were the first to point out that auroras do not occur at all times with equal frequency or in equal splendor. The former mentions that a great number of auroras were seen at the beginning of the 16th century (a misprint probably for the 17th, as the context seems to imply) to beyond the year 1624, after which nothing more was heard of them till 1686. Kämtz mentions that between 1707 and 1790 there was a remarkable increase followed by decrease of auroral action, the maximum frequency being attained in 1790. Prof. Olmsted considered that there was sufficient evidence to establish a period of 20 years during which auroral displays are frequent, preceded and followed by intervals of from 60 to 65 years during which few are witnessed. But it is open to question whether the existence of this long period is as yet established. The actual frequency of auroras cannot be inferred from observations made in temperate latitudes, where alone hitherto any attempt has been made to determine long periods. The longest period which has been thoroughly established is one of about 11 years. This period is associated with the occurrence of magnetic disturbances in cycles of 11 years. The connection

between auroral action and disturbances of the earth's magnetism appears to have been demonstrated, though doubt still remains as to the exact nature of the association. The perturbations of the magnetic needle undoubtedly attain their maximum extent at intervals separated by about 11 years. The researches of Sabine, Lamont, and Wolf appear to have established that fact beyond dispute. Hence we may infer that the auroral action waxes and wanes within the same period.—A remarkable association also appears to exist between disturbances of the earth's magnetism and the occurrence of spots on the sun. It has been demonstrated that the solar spots increase and diminish in a period of about 11 years; and that this periodicity corresponds exactly with the periodicity of the magnetic perturbations. A great solar outburst witnessed by Carrington and Hodgson, Sept. 29, 1859, was not only accompanied by extensive magnetic disturbances, but on the same day remarkable auroras occurred in both hemispheres. Telegraphic communication was interrupted on all the principal lines; the operators at Washington and Philadelphia received sharp electric shocks; and the pen used in Bain's system of telegraphy was followed by a flame. Some doubt has been thrown on the supposed connection between these circumstances and the solar outburst, in consequence of the failure of observers to obtain any corroborative evidence during the past 13 years; but the connection between the condition of the solar surface and the earth's magnetic state, and therefore the connection between the solar spot period and auroral displays, has been thoroughly established. The following table exhibits the number of auroras seen in each month, in America and Europe, according to the observations of Prof. Loomis of Yale college and Kämtz of Germany. These observations, however, must not be looked upon as indicating the relative frequency of auroras in America and Europe, because the observations of Loomis and Kämtz range over a different number of years:

	Loomis.	Kämtz.		Loomis.	Kämtz.
January.....	173	229	July	244	87
February.....	210	307	August	238	217
March	249	449	September ...	293	405
April	267	312	October.....	236	497
May.....	191	134	November....	215	285
June	179	65	December....	159	225

In each case there is a double maximum, the two equinoxes being the epochs at which auroras are most frequent; and it is noteworthy that in these months the solar poles are most inclined toward the earth, the southern pole in March, the northern pole in September; so that the southern spot zone is nearer to the centre of the sun's face in March than at any other time, while the northern spot zone holds a corresponding position in September.—As to the electrical character of the phenomenon no question can be entertained, though there are few problems of greater difficulty than the determination of the exact manner in which the electrical action is excited. It has been held by some that the aurora is due to electrical discharges from the earth. Through some cause the earth, regarded as a vast magnet, becomes overcharged (according to this theory) with electrical energy, and it is as this energy is gradually dissipated that the splendors of the aurora are displayed. It has been noticed that whenever the earth's magnetism is unusually intense an auroral display is to be expected. As soon as the aurora has made its appearance the intensity of the magnetic force begins to diminish. The more brilliant the aurora, the more rapidly is the extra energy of the earth's magnetism dissipated. "It has also been observed by operators of the Bain or chemical telegraph, that very singular effects are produced by the aurora upon the telegraph wires. The atmospheric electricity generated during thunderstorms passes from the wire to the chemically prepared paper, emitting a bright spark and a sound like the snapping of a pistol. It never remains long upon the wires, though it travels sometimes 40 or 50 miles before discharging itself. But the electricity produced by the aurora passes along the wires in a continuous stream with no sudden discharge, effecting the same result as that by the galvanic battery. A colored mark upon the paper is made by the positive current of the aurora as by the positive pole of the battery; the negative current, on the contrary, produces a bleaching effect. Preceding the appearance of the aurora faint blue lines appear on the paper, which gradually become stronger and darker so as to burn through several thicknesses of it. The effect then disappears, and is soon followed by the bleaching process, which entirely overcomes the artificial current of the batteries. When these effects have been observed, the aurora follows, and presents some of its most beautiful displays along the lines of these telegraphs; and so familiar have the operators become with the disturbance which the aurora causes, that they can predict its appearance with much certainty. They regard the electricity generated by it as precisely that of the electro-galvanic battery, which is distinguished by its voluminous current without intensity of action, differing from atmospheric electricity or the kind developed by friction, which may be dissipated by placing a wire conductor leading to the ground in close proximity to the line of wires." Capt. McClintock observed in the arctic regions that the aurora was never visible above ice fields, but that whenever an aurora was in progress the light appeared always to be gathered over the surface of the open water. Water being, as is well known, an excellent conductor of electricity, while ice is a non-conductor, we may infer that the peculiarity observed by McClintock was due to this difference in the conducting powers of ice and water. In fact, on the theory that the aurora is due to electrical discharges from the earth, these discharges were

interrupted by the fields of ice.—The study of the aurora with the spectroscope has revealed some important facts, though it has as yet thrown no light on the nature of the phenomenon. Angström of Sweden, in the winter of 1867–'8, recognized the existence of a bright yellow-green line in the auroral spectrum; and Otto Struve of Russia presently confirmed this result. It was at the time supposed that this line constituted the whole of the spectrum; and Dr. Huggins, commenting on the discovery, remarked in 1868 that the result seemed surprising when the ordinarily ruddy hue of the aurora was taken into account. "But Gen. Sabine tells me," he adds, "that in his polar expeditions he has frequently seen the aurora tinged with green, and this appearance corresponds with the position of the line seen by M. Struve." Later observations, however, and especially those made by Prof. Winlock in this country, have shown that the auroral spectrum is far more complex than had been supposed, and that it is also variable. It would appear that the bright green line is always present, and that it is nearly always the brightest line of the spectrum. But there is also a band in the red which, though usually much less intense, yet becomes even brighter than the yellow-green line when the red streamers of the aurora are exceptionally brilliant. The wave lengths of the green and red light correspond respectively to 558 and 635. Besides these there are faint greenish and bluish lines corresponding to wave lengths 544, 531, 522, 518, 501, and 485. Two other bands in the blue and violet between the lines F and G (one of them very close to G) have been detected in the spectrum of white parts of the aurora. They disappear or become faint in the parts having an intense red tint. During the great auroral display of Feb. 4, 1872, Father Perry of the Stonyhurst observatory (England) remarked that "the green line could always be detected, even where the unassisted eye failed to notice any trace of auroral light. This," he adds, "might suggest the advisability of a daily observation with a small hand spectroscope for those who are desirous of forming a complete list of auroral phenomena. Magnetic disturbances are a sure guide in the case of grand manifestations of aurora; but might not a very slight aurora be observable without the magnetic needle being sensibly affected?" One of the most remarkable circumstances hitherto ascertained respecting the aurora is the partial agreement of its spectrum with that of the solar corona. It is not indeed the case, as is sometimes stated, that the principal line in the coronal spectrum (known as the 1474 line, because agreeing with the corresponding line of Kirchhoff's scale) coincides with the bright yellow-green auroral line; but another and fainter auroral line agrees with Kirchhoff's 1474, and there is sufficient general resemblance between the coronal and auroral spectra to justify the theory that a real resemblance exists between the aurora and the solar corona. This theory was first worked out and published by Prof. W. A. Norton of Yale college; but Prof. Winlock of Cambridge also formed and published a similar theory.—Some doubt seems still to prevail on the question whether the bright green line of the auroral spectrum belongs also to the spectrum of the zodiacal light. Angström and Respighi have asserted that this is the case; but others deny that the auroral green line is ever seen in the zodiacal spectrum save when an aurora is in progress. Mr. Webb observes of the zodiacal light, Feb. 2, 1872: "It seemed to show a ruddy tinge not unlike the commencement of a crimson aurora borealis; this may have been a deception, but it was certainly redder or yellower than the galaxy. At 7 I examined it with a pocket spectroscope which shows very distinctly the greenish band of the aurora; but nothing of the kind was visible, nor could anything be traced beyond a slight increase of general light, which in closing the slit was extinguished long before the auroral band would have become imperceptible." M. Liais also, who has for several years studied the zodiacal light in tropical countries, finds its spectrum to be ordinarily continuous. Yet undoubtedly the yellow-green line is seen in the spectrum received from the region occupied by the zodiacal, during auroral displays; though whether it is then simply the auroral line seen in the direction of the zodiacal as well as in others, or partly received from the zodiacal itself, remains an open question. In the latter case it would follow, of course, that there is an intimate connection, as Mairan long ago suspected, between the zodiacal light, which is undoubtedly a cosmical phenomenon, and the aurora, which is as undoubtedly a terrestrial manifestation, though not improbably of cosmical origin. Prof. Olmsted had several years ago assigned to the aurora an interplanetary origin. "The nebulous matter," he reasoned, "like that which furnishes the material of the meteoric showers or the zodiacal light, and is known to exist in the interplanetary spaces, is probably the cause of the auroral displays. The periodical return of the phenomena indicates such a position; so too its rapid motion, which exceeds that of light or electricity, and the extent of surface over which the phenomenon is seen at the same time." It should be added that during the months of January, February, and March, 1872, when auroras occurred with unusual frequency, the zodiacal light shone with exceptional brilliancy.

AURUNGABAD, a city of N. W. Hindostan, in the native state of Hyderabad or the territory of the Nizam, on the Doodna, a small tributary of the Godavery, 175 m. E. N. E. of Bombay. It was an unimportant village called Gurka until the time of Aurungzebe, who made it a favorite residence, and built here a mausoleum to the memory of his daugh-

ter. The town is well laid out, but the buildings are in a dilapidated condition, and the climate is unhealthy. The population was estimated in 1825 at 60,000, but is now much smaller. Water is supplied by means of conduits and pipes, and a considerable trade is

Mosque of Aurungzebe.

carried on. The town was formerly the capital of a province of the same name, containing about 50,000 sq. m., which was incorporated with the Mogul empire in 1633. In more recent periods it belonged partly to the Mahrattas and partly to the Nizam, but is now mostly under British rule.

AURUNGZEBE, or Aurungzeb, the last great emperor of the Mogul dynasty in India, born Oct. 22, 1618, died at Ahmednuggur, Feb. 21, 1707. He was appointed by his father, Shah Jehan, to be viceroy of the Deccan. Here, while affecting an entire indifference for worldly things, he acquired military experience and amassed great wealth. In 1657 the emperor was taken suddenly ill, and Dara, the heir apparent and eldest brother of Aurungzebe, assumed the administration. Aurungzebe united with a younger brother in defeating Dara, and soon succeeded by his energy and treachery in putting to death all his brothers and their sons. His father, having meantime recovered, was confined for the rest of his life as a prisoner in his own palace, and Aurungzebe grasped the imperial power. His reign was the most brilliant period of the domination of the race of Akbar in India, and his empire included nearly all the peninsula of Hindostan, with Cabool on the west and Assam on the east. The first 10 years of his administration were marked by a profound peace, and his wisdom was especially signalized in the measures which he took in anticipating and assuaging a famine, and in suppressing an insurrection of Hindoo devotees headed by a female saint. A greater misfortune to him was the rise of the Mahratta empire, the foundation of which had been almost imperceptibly laid by an adventurer named Sevajee. Against this leader Aurungzebe sent in vain his most experienced generals, and he therefore marched into the Deccan himself to superintend the war. He resided in the Deccan 22 years, subduing the Carnatic and ruling an empire which in wealth and population was probably unsurpassed by that ever held by any other monarch. The proper name of Aurungzebe was Mohammed, and that by which he is commonly known, meaning the "ornament of the throne," was given him by his grandfather. He himself preferred the title of Alum-Geer, "conquerer of the world," and he was accustomed to have carried before him a globe of gold as his symbol. Yet to show that he as yet held but three fourths of the earth, he used to tear off a corner from every sheet of paper which he used in his correspondence. India owes to him several of her finest bridges, hospitals, and mosques. In his personal habits he was remarkable for an ascetic simplicity; and in his zeal for the Mohammedan faith he became a persecutor of the Hindoos.

AUSCHWITZ (Pol. *Oswiecim*), a town of western Galicia, in Austria, 32 m. W. of Cracow, and about 3 m. from the frontier of Prussian Silesia; pop. 3,600. It is the principal town of the former, originally Polish, then Silesian, and then again Polish, duchies of Auschwitz und Zator, with an area of about 1,000 sq. m., which in 1564 were united into one duchy by King Sigismund Augustus, and in 1773 incorporated with Austria. Although belonging to Galicia, the territory of the duchy was in 1818 declared by Austria to belong to the Germanic confederation. Only about one tenth of the population of the duchy speak German. In the war of 1866 there was an engagement at Auschwitz on June 27 between Prussian and Austrian troops.

AUSCULTATION (Lat. *auscultare*, to listen), a branch of medical art by which the states and motions of internal organs are discerned through the sounds which they produce. Pulsations, respirations, and the vibratory movements in the body produce sounds which may be distinctly heard by placing the ear upon the walls of the chest, or other parts of the external frame. The heart beats strongly many times per minute, and each pulsation gives a shock to the surrounding parts, and also produces a double sound within the heart itself. At every breath the air is first drawn into the lungs, and again passes out by expiration. The passage of the air into the lungs produces one kind of sound peculiar to the act of inspiration, and its exit another peculiar to expiration. In a state of healthy action, the sounds of the heart and those of the lungs and air passages are of a peculiar nature, and a little practice enables the ear to become familiar with each special sound. In a diseased state, the action of both heart and lungs is modified to some extent, and

the sounds produced are also modified in a peculiar manner. To assist the ear in distinguishing these sounds, Laennec constructed the stethoscope (Gr. *στήθος*, chest or breast, and *σκοπεῖν*, to examine), by the aid of which all the sounds of the heart and lungs may be distinctly heard, and the differences between healthy and diseased action readily discerned and classified. The art of auscultation has since then made rapid progress.—Auscultation is very useful in obstetrics, as well as in diseases of the heart and lungs. In difficult cases of parturition, it is often necessary to know whether the child is dead or alive in the womb before delivery. After the fifth month of pregnancy the pulsations of the fœtal heart may be distinctly heard, and the "placental murmur," caused by the uterine circulation of the blood, may also be distinguished by the ear.—Percussion is a branch of auscultation by which artificial sounds are obtained as a means of discerning the state of the parts from which these sounds proceed, particularly in regard to the presence or absence of air or liquids.—The art of auscultation is of comparatively recent date, but it was long believed to be a useful aid in diagnosis. In the middle of the 17th century Hooke observed that "there may be a possibility of discovering the internal motions and actions of bodies by the sounds they make. . . . I have been able to hear very plainly the beating of a man's heart." In 1761 Leopold Auenbrugger, a German physician residing at Vienna, published a small volume in Latin explaining an artificial method of producing sounds in various regions of the body, by which the physician might judge of the state of the subjacent parts. This method was percussion. The book remained almost unknown till 1808, when Corvisart translated it into French, and made the method known to all the countries of Europe. The practice of percussion has since become general, and in many cases is found highly useful. The method of studying diseases from sounds made by percussion led to the method of observing sounds made naturally, by the action of the heart and lungs. Corvisart took up the subject with great zeal, and three of his disciples, Double, Bayle, and Laennec, continued the same course, resulting in the discovery of the stethoscope, and the general use of auscultation.

AUSONES, the name of one of the most ancient tribes of Italy, whose origin is unknown. Tradition made them descendants of Auson, son of Ulysses and Calypso. They are held by Niebuhr to have been a portion of the great Oscan nation. From them the southern part of Italy, later known as Magna Græcia, was called Ausonia.

AUSONIUS, Decimus Magnus, a Latin poet and grammarian, born at Burdigala (Bordeaux) about A. D. 310, died about 394. He practised law for a time in his native town, and afterward became a teacher of grammar and rhetoric. In 367 he was selected by the emperor Valentinian to be tutor to his son Gratian, whom he accompanied into Germany the following year. He rose successively to the honorary titles and dignities of count of the empire, quæstor, governor of Gaul, Libya, and Latium, and lastly, in 379, of consul. His poetry is characterized by extreme licentiousness and pruriency, and is bald of invention and redundant in ornament. There has been much discussion whether Ausonius was a Christian or a pagan. The best editions of Ausonius are: a very rare one by Tollius (Amsterdam, 1671), with a commentary of Scaliger, and selected notes by various critics; the Delphin edition; and the Bipont of 1783, which is correct and of authority.

AUSSIG, a town of Bohemia, in the circle of Leitmeritz, at the junction of the Bila with the Elbe, 44 m. (direct) N. N. W. of Prague, with which it is connected by railway; pop. in 1869, 10,933. It was formerly strongly fortified, but in 1426 it was destroyed by the Hussites, and in 1639 it was seized by the Swedish general Baner. It has a church said to have been built in 826, containing a Madonna by Carlo Dolce, presented to the town by the father of Raphael Mengs, who was born here. The town has an active trade in fruit, mineral waters, timber, and especially in coal. The battlefield of Kulm is in the vicinity.

AUSTEN, Jane, an English novelist, born at Steventon, in Hampshire, Dec. 16, 1775, died in Winchester, July 18, 1817. She was educated by her father, who was rector of Steventon. It is not known at what time she commenced authorship. In her youth she was beautiful and graceful, but a disappointment in love determined her against marriage. "Northanger Abbey" (which was published with "Persuasion" after her death) was the earliest and weakest of her works, all of which, except the posthumous ones, appeared anonymously. "Sense and Sensibility" was published in 1811, and immediately obtained popularity. "Pride and Prejudice," "Mansfield Park," and "Emma" succeeded at regular intervals—the last in 1816. Her father was compelled by ill health to pass his latter years in Bath, and on his death his widow and two daughters returned to Hampshire, and removed in May, 1817, to Winchester. Her novels have long been popular as "distinct delineations of English domestic life, with a delicate discrimination of female character." Her own opinion was that one of her novels was "a little bit of ivory two inches wide," on which she "worked with a brush so fine as to produce little effect after much labor." Her life has been written by J. E. Austen-Leigh (London, 1871).

AUSTERLITZ, a town of Moravia, in the circle and 12 m. E. of Brünn on the Littawa river; pop. about 2,400. It owes its celebrity to the battle won here by Napoleon over the united Austrian and Russian armies, Dec. 2, 1805. After the capture of the Austrian general Mack at Ulm, Oct. 17, and the occupation of Vienna by the French, Nov. 13, the Austrian

and Russian forces were concentrated near Olmütz, and under command of the czar advanced upon Napoleon, whose forces were ranged in a semicircle having its centre near Brünn. The allies chose their position wrongly; and Napoleon, perceiving their error, ordered an instant attack, and routed them after a most severe contest. The allies lost about 30,000 killed, wounded, and prisoners. Austria was compelled to make the peace of Presburg; the emperor of Russia to return to his dominions; and the campaign ended leaving a large part of central Europe subject to Napoleon. The news of this disastrous battle is said to have hastened the death of William Pitt.

AUSTIN, a S. E. county of Texas, intersected by Brazos river; area, 1,024 sq. m.; pop. in 1870, 15,087, of whom 6,574 were colored. The Texas Central railroad passes through the county. Stock-raising is carried on to a large extent. Timber is abundant. In 1870 the county produced 444,544 bushels of Indian corn, 65,745 of sweet potatoes, 11,967 bales of cotton, and 19,362 lbs. of wool. There were 60,058 cattle, 5,768 horses, 7,554 sheep, and 15,657 hogs. Capital, Bellville.

AUSTIN, a city of Texas, capital of the state and of Travis county, on the Colorado river, 160 m. (direct) from its mouth, and 200 m. N. W. of Galveston; pop. in 1860, 3,494; in 1870, 4,428, of whom 1,615 were colored. The Colorado is navigable to this point in winter by steamboats. Austin is built on an amphitheatre of hills, and overlooks the valley of the Colorado and the rich prairies beyond. The public buildings are of a white stone called marble, but too soft to admit of polish. An artesian well has been sunk just north of the capitol, to the depth of 1,300 feet, from which a small stream constantly issues. The water is impregnated with lime, and has some medicinal qualities. It has been proposed to supply the city with water from the Colorado by an aqueduct. There are 8 or 10 churches in the city, and about 20 schools. The first free public schools in Texas were opened at Austin in 1871. There are 2 weekly newspapers published here, 1 triweekly, and 3 daily. An air-line railroad is in process of construction from Brenham (continuing the railroad from Galveston) to Austin, to be completed to the latter point in 1872.

AUSTIN, Jonathan Loring, secretary and treasurer of Massachusetts, born in Boston, Jan. 2, 1748, died May 10, 1826. He graduated at Harvard college in 1766, was a merchant and secretary of the board of war in Massachusetts, and in 1777 was sent to Paris to the American commissioners with the news of Burgoyne's capture. Dr. Franklin made him an additional private secretary, and sent him as his agent to England, where he resided in the family of Lord Shelburne. On his return with despatches in May, 1779, he was liberally rewarded by congress. In 1780, in his passage to Spain as agent of the state, he was taken and carried to England, but soon liberated. He was afterward state secretary and treasurer of Massachusetts.

AUSTIN, Moses, an American pioneer, born in Durham, Conn., died June 10, 1821. He led an adventurous life, engaged in lead-mining in Virginia and Missouri, and in 1820 went to Bexar, Texas, where he obtained from the Mexican authorities permission to colonize 300 families in some part of Texas. He died soon after, and the plan was carried out by his son. (See Austin, Stephen F.)

AUSTIN, Samuel, D. D., an American clergyman, born at New Haven, Conn., Oct. 7, 1760, died at Glastenbury, Dec. 4, 1830. He graduated at Yale college in 1783, and, after studying divinity two years, was ordained as pastor of the church in Fairhaven, Conn. In 1790 he became the minister of the first Congregational society in Worcester, and in 1815 president of the university of Vermont. After holding that office for six years, he removed to Newport, R. I., and thence at the end of four years returned to Worcester. During the last three years of his life his reason was clouded. He left several controversial and other works.

AUSTIN, Sarah, an English authoress, born in 1793, died at Weybridge, Aug. 8, 1867. She was one of the famous Taylor family of Norwich, and the wife of Mr. John Austin, a London barrister. Her reputation rests upon the unusual ability of her translations from German authors. Her first and most remarkable achievement in this kind was her version of the travels of Prince Pückler-Muskau, published under the title of "The Travels of a German Prince in England." The idiomatic painting and fluent ease of this translation were so admirable that for a long time it was difficult to persuade many persons that the work was not the composition of an English author. The first work which Mrs. Austin gave to the world under her own name was a translation of Falk's "Characteristics of Goethe" (1833), with many additions by herself. This book won an immediate and deserved success. She afterward published translations of Carové's "Story without an End," and Ranke's "History of the Popes," a "Collection of Fragments from the German Prose Writers," an excellent treatise on "Education," and "Sketches of Germany from 1760 to 1814."

AUSTIN, Stephen F., founder of the first American colony in Texas, son of Moses Austin, died Dec. 27, 1836. Setting out from Natchitoches, July 5, 1821, to follow up the grant previously issued to his father authorizing the formation of a colony, he went to the city of Mexico, where it was specially confirmed Feb. 18, 1823. By it he was clothed with almost absolute power over the colonists, and only obliged to report to the captain general. The colony, since become Austin, the capital of Texas, of which he selected the site after a careful reconnoitring of the country, had been previously organized by him upon the basis of giving to each man 640 acres of land, 320 for a

wife, 160 for each child, and 80 acres for each slave; and the immigrants being made up in great part of young unmarried men, he induced them to unite in pairs, making one of them the head of the family thus constituted, which singular arrangement is said to have resulted to the satisfaction of all concerned. In spite of frequent trouble with the Indians, the colony prospered, and, being followed by a considerable number of similar associations, the influx of Americans was so large that they met March 1, 1833, without the concurrence of the Mexican population, in a convention to form a constitution for the as yet Mexican state of Texas. Austin was one of the delegates chosen to carry the result of their deliberations to the central government at Mexico, and obtain its ratification. The delays and frequent revolutions at Mexico leading him to despair of success in his mission, he addressed a letter to the people of Texas, recommending a union of all the municipalities to organize a state. For this he was arrested and kept in prison three months, until released by Santa Anna, who continued to hold him as a sort of hostage. In September, 1835, he returned to Texas, took part with the revolutionary party, which had been forming in his absence, and was put in command of their little army. His first act was to send into eastern Texas for Gen. Houston, who was soon elected to the chief command, Austin being appointed a commissioner to the United States. Here he acted with prudence, and was very successful in preparing the public mind for the independence and annexation of the new republic. After spending some time in advocating this measure, he returned to Texas in July, 1836; and he died while still engaged in negotiations.

AUSTIN, William (Billy), the reputed natural son of Queen Caroline. He was known as a poor lad of Deptford, near London, who bore a striking resemblance to the queen; and though her majesty was judicially acquitted in 1808 of the charge of being his mother, she insisted upon keeping him near her person. In 1830 he was sent to a lunatic asylum at Milan, and remained there till 1845. Being then brought back to England and subjected to a medical examination at the request of his guardians, the Right Hon. S. Lushington and Sir J. P. Wilde, he was transferred to a private asylum in London.

AUSTRALASIA (South Asia), the S. W. division of Oceania, extending from the equator to lat. 47° S., and from about lon. 112° to about 170° E. It embraces Australia, Tasmania or Van Diemen's Land, New Zealand, and Chatham isle, on the west and south; Papua, the Admiralty isles, New Ireland, and the Solomons archipelago on the north; Queen Charlotte's isles, the New Hebrides, and New Caledonia, on the east; and all the interjacent islands. On account of the black color of its natives, Australasia is also called Melanesia, chiefly by French geographers. (See Oceania.)

AUSTRALIA, formerly called New Holland, an island, classed as a continent by most geographers, lying S. E. of Asia and the Sunda islands, between the Indian and the Southern Pacific oceans, and extending from lat. 10° 43′ to 39° 9′ S., and from lon. 113° to 153° E. From its western extremity, Steep point, to its extreme eastern point, Cape Byron, its length is 2,500 m.; and its breadth, from Cape York, its northernmost point, to its southern extremity at Cape Wilson, is 1,900 m. Its entire coast line embraces a circuit of 8,000 m., and its area is estimated at 3,000,000 sq. m. The configuration of the Australian coast displays little irregularity; there are but two or three large peninsulas, and although small bays are found along almost the whole coast line, the gulf of Carpentaria, and the large inlet leading to Cambridge gulf and Queen's channel on the north, and Spencer and St. Vincent gulfs on the south, are the only deep indentations. A long curve of the southern coast forms the vast bay called the Great Australian bight, but this is only a portion of the open ocean.—From the N. E. extremity of the continent, where the long, triangular peninsula of York lies between the gulf of Carpentaria and the Pacific, its northern extremity only separated from New Guinea by the narrow Torres strait, the coast trends southeastward for more than 1,400 m. to Cape Byron, where its direction suddenly changes to southwest. Along the greater part of this N. E. stretch of coast, from Cape York nearly to the Great Sandy island, lie the Great Barrier reefs, the most extensive range of coral reefs known in the world. Frequent though often dangerous passages through this barrier permit the entrance of vessels into the sea lying between it and the mainland, a body of water varying in breadth from its southern entrance, where it is a broad open sea, the reefs lying at a great distance from the coast, to its central point at Cape Tribulation, where it hardly affords even a passage. Further N. it again stretches away from the coast, extending across the E. end of Torres strait. Near the southern entrance of the sea thus enclosed, and a little N. of Sandy island, are numerous good harbors. The coast is here made up of high and precipitous cliffs, and this formation continues to characterize its whole extent, as far as its southern extremity, with the exception of a small portion S. of Cape Howe. Below Cape Byron, where it trends to the southwest, it contains some of the best harbors in the world, chief among them that of Port Jackson at Sydney. The S. coast, from Cape Wilson W. to the beginning of the Great Australian bight, is also celebrated for its excellent harbors; only a short strip of coast E. of Encounter bay is without good shelter. But with the Australian bight begins a long uniform line of cliffs without refuge of any kind for vessels, steep and rugged, and continuing W. as far as the Recherche archipelago. West of this are a few safe ports. The W. and N. W. coasts are the least

Longitude West
Timor
Melville
Bathurst I.
Clarence St.
Port Darwin
Anson B.
C. Londonderry
C. Bougainville
Admiralty G.
Cambridge G.
Queens Chan.
York Sound
Brunswick B.
Victoria
Collier B.
Buccaneer Arch.
King Sound
C. Leveque
Glenelg District
Roebuck B.
Lagrange B.
Sturt Creek
Wittenoom Mt.
Mt. Muller
Mt. Wilson
F. Larrey
C. Thouin
Bampier Arch.
De Grey R.
Sherlock R.
Fortescue R.
Mt. Macpherson
Barrow I.
N. West C.
Exmouth G.
Mt. Vigors
Mt. Bruce
Ashburton R.
Hardey R.
Tropic of Capricorn
C. Cuvier
Geographe Channel
Dorre I.
Sharks Bay
Dirk Hartog I.
Steep Pt.
Hamelin Harb.
Lyndon R.
Gascoyne R.
Murchison R.
Mt. Augustus
Mt. Labouchere
Mt. Gould
Mt. Murchison
W E S T E R N
A U S T R A L I A
L. Austin
Mt. Farmer
East Mt. Magnet
Cheraldine Mine
Salt L.
Geelvink Chan.
St. Georges Ra.
Hautman Abrolhos
Arrowsmith R.
L. Barlee
Mt. Horner
L. Moore
Mt. Churchman
Mt. Jackson
Mt. Peron
Mt. Marshall
Lion Cowing
L. Lefroy
L. Cowan
Hampton Range
Great Australian Bight
Breton B.
Moore R.
Darling Range
Perth
Fremantle
Swan R.
York
R. Avon
Bremer Ra.
Dundas Hills
Salt Lakes
Russell Ra.
Ravensthorpe Hills
Mt. William
Geographe B.
C. Naturaliste
Blackwood R.
Stirling Ra.
Doubtful I. Bay
Recherche Arch.
C. Leeuwin
Flinders B.
Albany
King George Sd.
Pt. D'Entrecasteaux
R. Forth
AUSTRALI
English Miles
50 100 200 300
TASMANIA
OR
VAN DIEMENS LAND.
George Town
Launceston
Perth
Longford
Lemont
Falmouth
Evandale
Swanport
Oyster B.
Schouten
Hamilton
Richmond
Maria I.
Hobart Town
Tasman Peninsula
Port Arthur
Sturges Bay
Maria I.
Pt. Hibbs
Macquarie R.
C. Sorell
Pieman R.
Sandy C.
West Pt.
Robbins I.
Hunter I.
Ringarooma B.
Dalrymple B.
Port Sorell
Port Dalrymple
Circular Hd.
Table Cape
Cape Grim
Woolnorth
Hunter R.
Tamar R.
Macquarie Harbour
King William R.
Derwent R.
Huon R.
Port Davey
Bathurst Harbour
S.W. Cape
S.E. Cape
Tasman Hd.
Eaglehawk Neck
Tasman Peninsula
Forestier's Peninsula
Timor
Roti

148°
143°
138°
133°
10°
15°
20°
25°
30°
35°
135°
140°
155°
New Guinea
Torres Strait
Pr of Wales I.
Albany I. & Somerset
Mulgrave I.
Banks I.
Cape York
Peninsula
GULF OF
CORAL
SEA
Louisade Archipelago
Sudest I.
Wessel I.
Arnhem B.
C. Arnhem
Liverpool R.
Castlereagh B.
Mc Norris B.
Groote Eylandt
Roper R.
CARPENTARIA
Sir E. Pellew Is.
Wellesley Is.
Nicholson R.
Leichhardt R.
Gregory R.
Mitchell R.
Staaten R.
R. Van Diemen
R. Land
R. Gilbert
R. Norman
R. Flinders
Burke R.
Burke Cr.
Cloncurry R.
Mt. Barry
Mt. Ida
Cardwell
Rockingham B.
Hinchinbrook
Halifax Bay
Bowling Green B.
Mt. Elliot
Burdekin R.
Port Denison
Edgecumbe B.
Bowen
Lamberland Is.
Northumberland Is.
Broad Sd.
Port Bowen
Great Barrier Reef
Tribulation
Trinity Bay
C. Grafton
C. Flattery
Princess Charlotte B.
Melville
Lloyd B.
Batavia R.
Shelburne B.
C. Grenville
Ashburton Range
Mt. Hawker
Hayward Gr.
Mt. Woodcock
Mt. Doull Range
Mt. Blyth
Mt. Fisher
Mt. Mann
Central Mt. Stuart
Musgrave Range
Mt. Muller
Mt. Narrien
Peak Range
Grafton Range
Expedition Range
Thomson R.
Victoria R.
Barcoo R.
Cooper Cr.
Wilson R.
Wilkinson Cr.
Wallace Cr.
Parru R.
Warrego R.
Culgoa R.
Balonne R.
Maranoa R.
Comet R.
Nogoa R.
Mackenzie R.
Dawson R.
Isaac R.
Connor R.
Peak Downs
Fitzroy Downs
Denham Range
Darling Downs
Mt. King
Mt. Lindesay
Mt. Perry
Mt. Bunny
Mt. Bauple
Mt. Lofty Ra.
Mt. Abundance
Mt. Bindango
Mt. Bartle Frere
Mt. Elliot
Mt. Dryander
Mt. Inkerman
Mt. Larcom
Mt. Wyatt
Mt. Hedlow
Mt. Hay
Mt. Hardwick
Mt. Beerburrum
Mt. Tinbeerwah
Mt. Pisgah
Mt. Barrow
Mt. Lindsay
Mt. Warning
Mt. Lindesay
Mt. Barney
Mt. Clunie
Mt. Cordeaux
Mt. Kembla
Mt. Keira
Mt. Bellenden Ker
Mt. Dromedary
Mt. Gardner
Mt. Gower
Mt. Bingar
Mt. Kaputar
Mt. Canobolas
Mt. Bindaay
Mt. Bathurst
Mt. Werong
Mt. Murray
Mt. Imlay
Mt. Dromedary
Mt. Kosciusko
Mt. Pendlebury
Mt. William
Mt. Alexander
Mt. Buninyong
Mt. Macedon
Mt. Disappointment
Mt. Cole
Mt. Arapiles
Mt. Gambier
Mt. Schank
Mt. Burr
Mt. Muirhead
Mt. Lofty
Mt. Remarkable
Mt. Brown
Mt. Arden
Mt. Bryan
Mt. Ive
Mt. Finke
Mt. Chambers
Mt. Stevenson
Mt. Hamilton
Mt. Gregory
Mt. Torrens
Mt. Frome
Mt. Lyell
Mt. Bonwick
Mt. Darwin
Mt. Danger
Mt. Byron
Mt. Warrenheip
Mt. Egerton
Mt. Blackwood

favorable of all to navigators; they are generally destitute of harbors, only a few really useful ones being found near the Buccaneer archipelago. The N. W. coast is high and rocky, the western low and sandy. The N. coast, made most irregular of all by the two peninsulas of Arnhem Land and York, and by the gulf of Carpentaria, has in its western part some of the best harbors of the continent, though they are not as well known as the southern ports. The gulf of Carpentaria itself has a sandy, low, and dangerous E. coast, but its western side has numerous sheltered bays and safe navigation. That portion of the Indian ocean which washes this coast, extending between New Guinea and Australia to the Torres strait, is called the Arafura sea.—The interior has been only partially explored. It seems to have the character of a table land of moderate height studded with groups of small mountains, and in the interior sometimes sinking into low swampy valleys; while on the general level of the table land itself are vast plains, sometimes fertile, but oftener sandy, or covered with the long stiff grass called spinifex. There are many swamps, but few ponds or useful watercourses. Large desert tracts, covered with stones or low shrubbery, are frequently found. Near the coasts, however, greater and sometimes luxuriant fertility prevails, and here the varied surface of the country displays some of the most beautiful scenery in the world. The southeastern and eastern portions of Australia are all that have thus far been thoroughly and scientifically explored. Along the whole E. side of the continent lie ranges of mountains of considerable height, sometimes actually touching the coast, but generally in their southern portion lying at an average distance of 40 to 50 m. from it, while in the north they are still more distant. These are often considered as a single range, but are more correctly divided into several distinct portions. The Australian Pyrenees and the Grampian Hills, which run parallel to the S. coast E. and W. of Melbourne, may be considered a western offshoot from the southern extremity of this system. Their summits are generally low, but in two or three places near their junction with the principal range they attain a height of between 5,500 and 6,000 ft. The first of the main chain of the E. coast, beginning at Cape Wilson, are the highest mountains of the country, the Australian Alps, having their principal peaks, according to Petermann's map of 1872, in Mt. Kosciusko, 7,176 ft. high, the loftiest peak yet discovered in Australia, and Mt. Hotham, 6,414 ft. In the neighborhood of these mountains lies the grandest scenery of the continent. Ragged cliffs of great height, crowned with forests, hem in the fertile valley of the Murray river, which has its source in this range. These rugged Alpine features characterize the entire chain, and the smaller parallel ranges and offshoots are scarcely less picturesque. N. of the Australian Alps and W. of Sydney are the Blue mountains, the next group in the chain. They nowhere reach a greater height than 4,100 ft., but the same wild scenery prevails through their whole extent. N. of these again lies the Liverpool range, trending toward the east, where the somewhat isolated Mt. Sea View rises to the height of 6,000 ft., and lying almost at right angles to the general direction of the system. W. of the Blue mountains are two other chains, offshoots of the main formation—the Honeysuckle range and the Canobolas group, the latter of greater height than any peaks of the Blue mountains themselves. N. of the Liverpool range the mountains become more scattered, extending E. and W., and no longer preserving the narrow and regular line their principal peaks have heretofore kept. In this irregular mountain region the principal summit is Mt. Lindsay, S. W. of Brisbane, 5,700 ft. high. From this point the same wide and irregular formation extends to the north, at least into York peninsula, and probably even to its extremity. It appears, from such explorations as have been made, to attain its greatest height in the S. E. part of the peninsula. Along the S. coast, near the head of Spencer gulf, are low chains of mountains little more than 3,000 ft. high. The Darling, Herschel, and Victoria ranges, which have been discovered on the S. W. coast, have seldom a height of more than 2,000 ft. One peak, however, Mt. Bruce, near King George's sound, is a little more than 3,100 ft. high. No considerable mountains have been discovered in the interior of the continent.—Very few of the rivers of Australia are navigable, and in most of them running water is only found during a small portion of the year. The most remarkable peculiarity of these streams is the suddenness with which, even when full of water, they disappear into a quicksand or marsh. Thus, although these creeks and rivers are almost innumerable, they fail to irrigate the soil. Only a few exceptions to this rule are found. Among these the chief is the Murray or Goolwa, which rises in the Australian Alps, and flows about W. N. W. for more than 500 m., when, by a sharp turn in its course, called the Great Bend of the Murray, it changes direction to the S., and empties 100 m. further into Lake Alexandrina, a basin connected with the sea. The Murray and its tributaries, the Murrumbidgee and Lachlan, are lasting streams; but of its other tributaries there are none which do not become partially dry in the summer. Even the Darling, a river of considerable size flowing into the Murray from the north, shares this peculiarity. The other permanent streams of Australia are short and of comparatively little importance; the best known are those which flow from the coast ranges directly into the sea. Among them are the Hawkesbury, Hunter, Clarence, Brisbane, Fitzroy, and Burdekin, on the eastern coast; the Glenelg, Hopkins, Yarra-Yarra, and others, on the southern; the Swan, Murchison, Gascoyne, and Fortescue, on

the western; and on the northern, the Victoria, Alligator, Roper, and Flinders. The lakes of Australia consist, during the greater part of the year, of swamps full of weeds and grass, or of mere beds of mud or sand. This applies even to the largest inland bodies of water yet discovered, which lie grouped together near the centre of the S. coast, N. of Spencer gulf. Here is Lake Torrens, about 140 m. in length, but very narrow, lying about 40 m. from the head of the gulf; and 50 m. further N., Eyre lake, still larger. E. of this is Lake Gregory, which might be more correctly called Gregory lakes, since it is divided into numerous parts, between which no considerable communication has been discovered. W. of Lake Torrens lies the extensive Lake Gairdner, and E. of it Lake Frome. The water of this group of lakes contains a large proportion of salt, and salt also abounds in the marshes and innumerable swampy ponds which lie in this region.—The geological structure of Australia has not been thoroughly ascertained. It appears, however, that the main table land rests on tertiary sandstone, directly overlying the primary rocks, the fact that no traces of a secondary formation have been found forming one of the most remarkable features of Australian geology. The mountains rising from the table land in the interior are, on the contrary, generally of volcanic structure. In the range of the S. W. coast primary rocks are most prominent—granite, syenite, &c.; and all the greater coast ranges probably resemble these. In several of the great valleys in the S. E. part is found a limestone containing numerous fossils. Bituminous coal is abundant near Newcastle at the mouth of Hunter river in the eastern part of New South Wales, and large mines are already worked there. Rich deposits of copper are also found at Burra-Burra, Wallaroo, and Kapunda in South Australia—that at Burra-Burra being probably the richest in the world. The famous gold fields are in the Bathurst district and the N. W. part of Victoria. Every indication shows that only in the latest geological period has Australia risen from the sea. The recent deposits following directly on the primary rocks, the salt lakes, the whole construction of the continent, indicate this; and geologists affirm that the southern coast is still in process of imperceptible but constant upheaval.—The climate of Australia is exceedingly hot, but dry and healthy in such southern parts as are already colonized, where it appears favorable to European constitutions, and resembles in many particulars the climate of Spain. In the extreme north, beyond the tropic of Capricorn, which crosses the continent near its centre, the heat is more oppressive, and the absence of large streams gives almost the arid climate of a desert. Here, however, the tropical rainy season brings relief with unfailing regularity, lasting from November till April; while in the south the rains, though of tropical violence, are irregular, occurring at intervals between March and September, and often leaving the country exposed to long droughts. There appears to be almost no rain in certain portions of the central continent, and these have become deserts, from which hot winds blow toward the coast, carrying clouds of sand. Extraordinary variations of temperature are among the most remarkable phenomena of the country. Falls in the mercury of 20° to 30° F. in half an hour are common on the coast, especially in the summer; and comparing the reading of the thermometer in the sun at noon with the same at midnight, a variation of 99° in the 12 hours has been observed. The average height of the thermometer for the year on the N. coast is about 80°; at Port Macquarie on the E. coast, 68°; at Port Jackson (Sydney), 66°; at Melbourne, on the S. coast, 61°; at Perth, on the W. coast, 64°. In summer, however, the mercury often rises to 100°, or even 120°. One traveller (William Howitt) has even stated his experience at 139°.—The animals of Australia are peculiar, not less in themselves than in their distribution. The carnivora are few, and the only really destructive beast of prey is the dingo, an animal in size between a fox and a wolf, and resembling a dog. The dingoes roam about in packs and attack sheep, killing and wounding many, but eating few. Ruminating animals and pachyderms are unknown. But while Australia is thus deficient in the classes of animals most abundant in other parts of the world, its fauna consists very largely of a class elsewhere but sparingly represented—the *marsupialia* or pouched animals. Of these the largest and perhaps the most common is the kangaroo. A smaller species of this animal is called the wallaby. The opossum, the *petaurus* or flying opossum, and the *dasyurus* (a carnivorous pouched animal) are the other species most frequently met with. Another peculiar family inhabiting Australia are the monotremata, including the two curious species *echidna*, or porcupine ant-eater, and *ornithorhynchus*. The latter species is a water animal shaped like a beaver, but has web feet, a bill like that of a duck, and in the case of the male spurs upon the hind feet. (See MONOTREMATA.) There are five species of rodents, four small and insignificant, and one somewhat larger and resembling the beaver in its habits. The birds include several of the largest species of eagles, falcons, and owls. Parrots of the most brilliant plumage, birds of paradise, and orioles are abundant; while among the peculiar birds are the emu, the black swan, the ibis, and the "laughing jackass" or "bushman's clock," a large kingfisher, with a remarkable voice. The marine animals include the dugong, found along the northern shore between Moreton bay and Cape York. Sharks abound on all the coasts. The amphibious animals are few and small. Few of the serpents are venomous, and none are of great size. The insects, however, include several species whose

bite is poisonous—the scorpion, centipede, and several kinds of spiders. Ants of all sizes abound; some are found an inch long, living in immense hills, and really formidable from their swarming attack and painful bite.—It is said that nine tenths of the 8,000 species of plants found in Australia are unknown elsewhere, and are entirely unconnected with the forms of vegetation of any other division of the world. The great majority of these belong to two genera, the *eucalypti* (a genus of the myrtle family) and the acacias. Of the former more than 100 varieties are known, spread over the whole continent. Many of the trees of this genus attain the height of 200 ft., with a girth at the base of 30 or 40 ft. Of the acacias, too, more than 100 species have been discovered. Cedars and casuarina are the chief representatives of the coniferæ. *Xanthorchœæ* are abundant, and near the coast grow to a height of 300 ft., the principal kind being called by the colonists the black boy or grass gum tree. Only a few palms are found. The principal Australian trees, the eucalypti and many of the acacias, have some remarkable peculiarities. Both have their leaves perpendicular to the surface of the earth—the edges of the leaves turned toward the ground instead of their flat sides. Many of the eucalypti shed their bark, but their leaves do not change, remaining green and on the tree through the whole year. Among the other curiosities of the Australian flora are the arborescent ferns, which attain the perfection of trees, putting forth branches eight to twelve feet long; the giant lily (*doryanthemum*), an object of great beauty; the tea tree (*leptospermum grandiflorum*); and the remarkable stench plant (*hydrocotyle densiflora*). In the interior of the continent the giant kangaroo grass, so high as to conceal cattle, or even a horse and rider, is found covering great plains; while the more sterile tracts are covered with the hard, sharp spinifex (*triodia pungens*). The brilliant flowers of Australia have little fragrance, but the leaves of several kinds of trees are highly aromatic.—Though the continent has few indigenous fruits or useful vegetable products, nearly all those of other countries thrive in its climate. On the N. E. coast, in the Moreton Bay settlement, the Japanese loquot, the date palm, and the prickly pear, cotton, sugar, coffee, and tobacco have been naturalized; while bananas, oranges, and lemons grow here, as well as on the W. coast. In New South Wales, Victoria, and South Australia, the cereals flourish with unsurpassed productiveness, and 64 lbs. to the bushel has been produced in Australian wheat. All kinds of garden produce are of superior character; almonds, figs, apricots, melons, grapes, quinces, apples, pears, and plums are produced in great quantities.—The mineral wealth of Australia, even if we consider only that portion already developed, is remarkable. It has been known from very early times to possess iron and other minerals. The gold existing in pure masses does not seem to depend on stratification, but has probably been upheaved along with other matter, and washed down by surface or subterranean currents. All that can be safely predicated of the materials in company with which gold is found, is that quartz and pipe clay are very generally associated with it. The quartz is abundant, and is found from minute pebbles worn smooth by attrition to huge blocks of many tons' weight which crop out from the surface in irregular and fantastic forms. It is usually milk-white and opaque, but occasionally attains a semi-crystalline transparency. Besides this, however, gold is found intermixed with sandstone, ironstone, and white and blue clay. The range over which gold extends is altogether undetermined. Recent accounts announce its discovery at the furthest limits of exploration. The profitable diggings have until recently been confined to the Bathurst district, in the north of New South Wales, and to the hill country in the north and northwest of Victoria; but the new diggings in Queensland, especially at Gympie, are yielding very richly. In minute portions gold has been found all over the colonies. It was at first met with in small pieces on the actual surface; as the surface supply became exhausted, it was found at a short distance down, and the diggings have increased in depth as they have decreased in general richness. At Ballarat, near Geelong, where the most valuable lumps of gold have been procured (28, 60, and 136 lbs. in weight), the shafts are sunk to a depth of more than 100 feet. The gold has never been found otherwise than in detached pieces or particles, varying in size from minute globules to weighty masses; and where its close contiguity has assumed the character of a vein, it is only that the deposit has been washed together into a subterranean channel or gutter. The copper mines of Burra-Burra and other localities, and the coal deposits in various quarters, have already been referred to. Tin, lead, silver, and precious stones of various kinds have also been discovered in the search for gold, and passed over for the present.—The aborigines of Australia are of a distinct race from that inhabiting the Indian archipelago. They are found only in the Australian islands, in New Guinea, the New Hebrides, New Caledonia, and the Solomon islands. The New Zealanders are akin to the inhabitants of Polynesia. The Australians are black, with some slight variety of shade from brown-black to jet. They have curly hair, but not the crisp wool of the negro. Their faces are well developed, broad at the base, their lips less protruding than those of the negro; their bodies are deficient in muscularity and strength, but capable of great endurance. They are superior in native intelligence to the Tierra del Fuegans, and they readily adopt European habits. They seldom build huts or other fixed dwellings, but content themselves with a strip of bark or a large bough as a

shelter from the wind. Whether they knew the use of fire is uncertain; they now kindle fires by rubbing two dry sticks together. But

Australian Man and Woman. (From Photographs.)

they frequently eat their food raw, and their cooking is performed by making a hole in the ground, lighting a fire in it, putting in the slain animal, and covering it with earth until the fire is out, when it is considered sufficiently cooked. In the wild districts they go entirely naked; in the vicinity of settlements they wear sheepskins, or the blankets and clothing distributed to them by the settlers. They have not the use of the bow, but are expert with the spear, which they fling 70 or 80 yards with the greatest nicety. They use the club or waddy; and they have the boomerang, a

Aboriginal Shelters.

peculiar missile, resembling a double-edged wooden sword, bent to an ellipse; on being thrown into the air it strikes the ground at a distance and rebounds toward the thrower. The several tribes are engaged in frequent feuds with each other, but are not usually courageous in the presence of the whites. In the early times of the colony, however, they frequently exhibited great pertinacity in their attacks on out-stations. Their temper is generally pacific and friendly. Their numbers are very limited; the highest recent estimate is 50,000, and even this is probably much over the mark. The use of ardent spirits has made great ravages among them. They are subject to cutaneous diseases, attributable to their extremely filthy habits. They are polygamists, and their marriages are entirely without ceremony, the bridegroom merely carrying away the bride, with or without her consent. Their burials, on the contrary, are accompanied by certain superstitious observances; the dead are buried in the exact places in which they died, and these spots are never inhabited again by members of the dead men's tribe. The names of the dead are never pronounced, and those bearing the same names are obliged to change them. Their religious opinions are simple; they believe in a good and a bad spirit. They believe that white men are the reanimated souls of blacks. Many efforts for their conversion to Christianity have been made, but without permanent success. All the colonial governments keep up native schools. In New South Wales a black police was at one time formed, whose services were very valuable in tracking depredators, from their native skill in following a trail. Some few of the blacks are occasionally employed as stockmen or shepherds; but they are, like all savages, averse to regular labor of any kind. They are rapidly decreasing in number, and in a few decades will probably be almost extinct.—The political divisions of Australia, the dates of their official organization as colonies, their areas (chiefly estimated), and their population in 1871, are as follows:

DIVISIONS.	Date of Organization.	Area in square miles.	Population in 1871.
New South Wales	1788	323,437	501,611
Victoria	1851	86,831	729,868
South Australia	1836	883,328	188,995
Queensland	1859	678,000	115,567
Western Australia	1829	978,000	24,785
Northern Territory (not yet organized)	....	523,531	201
Total		2,973,127	1,561,027

The rapid growth of the colonies may be seen from the fact that New South Wales in 1821 only numbered 29,783 inhabitants; Victoria in 1836, 224; South Australia in 1838, 6,000. The majority of the inhabitants of each colony are of British descent; the number of natives of Germany is 9,000 in New South Wales, with a smaller number in the other colonies. The number of Chinese is about 70,000 (17,000 in Victoria), and it is steadily increasing. The

largest cities and towns of Australia are Melbourne (Victoria), pop. 190,000; Sydney (New South Wales), 135,000; Ballarat (Victoria), 74,000; Sandhurst (Victoria), 34,000; Adelaide (South Australia), 27,000; and Geelong (Victoria), 22,000.—In the early days of the Australian colonies clergymen were merely chaplains to the convict establishments. Subsequently an act was passed for the support of Episcopal churches and schools, to which one seventh of the crown lands was to be devoted. Sir Richard Bourke prevailed upon the English government to assist all denominations of Christians in building places of worship and supporting their ministers. In Queensland an act was passed in 1860 abolishing state aid to religion altogether, and the other colonies are likewise more or less approaching the voluntary system. Thus the most populous colony, Victoria, has reduced the state aid to an annual subsidy of £50,000. The number of Roman Catholics in 1871 was estimated at 250,000; of Jews, 5,500; of Mohammedans and pagans, about 42,000. A few thousand belong to no religion; the remainder are Protestants, more than one half being connected with the church of England. This church has nine bishops, namely, of Sydney, Newcastle, Bathurst, Adelaide, Melbourne, Perth, Brisbane, Goulburn, and Grafton and Armidale. The Roman Catholic church in 1871 had one archbishop (in Sydney) and ten bishops.—The cause of education has made great progress. Each of the colonies has its board or council of education, consisting of a number of members appointed by the government. The system of public education is more or less assimilated to the national system in Ireland. The government provides, under conditions which differ in the several colonies, for the establishment of common schools, and also grants aid to schools not established by the government on their complying with certain regulations. The state also assists the formation and maintenance of educational establishments of a more advanced character. In several colonies education has been made compulsory. In 1871 the number of schools under the control of the government boards amounted to about 3,640, with 255,000 pupils under 6,600 teachers. Nearly all the colleges, of which there are many, bear a denominational character. Sydney and Melbourne have universities.—The revenues of the colonies are chiefly derived from duties, public lands, the post office, railroads and telegraphs, stamp duties, and licenses. The public debts have been chiefly contracted for the establishment of railroads, ports, and other public works. The foregoing table exhibits the revenue, expenditures, and public debt of each of the colonies in 1870.—Gold still constitutes the chief article of export. The aggregate value of precious metals exported from Australia amounted in 1869 to £10,870,000. Next to gold the most important article of export is wool, the value of which in 1869 was estimated at £8,161,000. South Australia exports large quantities of wheat (£866,870 in 1869) and copper (£622,681). The breeding of cattle has become an important occupation of the colonists. The colonies had in 1871 about 22,100,000 sheep, 2,600,000 horned cattle, and 732,000 horses. The following table exhibits the imports and exports of the colonies in 1870:

COLONIES.	Imports.	Exports.
New South Wales	£7,757,281	£7,991,088
Victoria	12,453,757	12,470,014
South Australia	2,029,793	2,419,487
Western Australia	232,590	204,447
Queensland	1,536,799	2,006,635
Total	£24,010,220	£25,091,621

The merchant navy of the colonies consisted on Jan. 1, 1871, of 1,192 vessels, with an aggregate of 169,000 tons. The entries and clearances in the Australian ports in 1869 represented an aggregate of 3,774,909 tons. All the colonies had railroads at the close of 1871, with the exception of Western Australia, where their introduction was expected at an early date. The greatest progress in this respect has been made in New South Wales, which in 1871 had 431 m. of railroads. The aggregate length of the Australian railroads at the close of 1871 was about 1,110 m., and a very considerable extension of the railroad system was about taking place in several colonies. The electric telegraph has been introduced into each of the colonies. The length of the wires in 1871 was 5,053 m. in New South Wales, 3,368 in Victoria, and about 13,400 in all the colonies. All the colonies except Western Australia are connected with each other by telegraph, and since 1869 by a submarine cable with Tasmania. Telegraphic connection between Australia and England, by means of a submarine cable connecting Java and Port Darwin, was nearly completed at the beginning of 1872. The government in each colony consists of a governor appointed in England, a legislative council, and a legislative assembly elected by universal suffrage.—Australia first became known to Europeans in the beginning of the 17th century. Though a vague outline of land in this portion of the southern ocean appears upon the map of some Portuguese navigators dated 1542, the first real discovery was probably made by the Dutch in 1606, when the captain of the yacht Duyfken, sent out from Bantam to explore a part of the coast of New Guinea, saw the northern shore of the continent at a distance. In the same

COLONIES.	Revenue.	Expenditure.	Public Debt.
New South Wales	£2,442,640	£2,602,979	£9,681,130
Victoria	3,070,959	2,618,013	10,385,900*
South Australia	564,639	736,160	1,944,700
Western Australia	98,131	112,905	No debt.
Queensland	743,053	771,991	3,459,750*

* 1869.

year Torres strait was named from a Portuguese navigator who sailed through it. In 1616 Hartog, a Dutch captain, came upon the W. coast of Australia and called it Endracht's Land, from the name of his ship. From this time other parts of the W. coast were discovered. In 1622 the Leeuwin discovered the S. coast at Cape Leeuwin, and shortly after Van Nuyts sailed from that cape on the S. coast to Spencer's gulf. De Witt's Land and Carpentaria, in North Australia, were also discovered by Dutch traders. Capt. Cook in 1770 discovered New South Wales and Botany Bay, which was so called by Sir Joseph Banks, the botanist of the expedition, from the wonderful floral display which its plains afforded. In 1788 the first English colony was established in New South Wales, at first as a penal settlement. The original design of the British government was to make this penal station at Botany Bay itself; but a better locality was found at Sydney, and Capt. Phillip was sent out with a squadron having on board 850 convicts and a guard of 200 men and officers. In this convict colony, placed as it was under the absolute control of a governor with almost unlimited power, every kind of abuse and vice grew up; and of these the free colonists who afterward began to settle in the district felt the effects in many ways. A conflict grew up between them and the government on the question of abolishing the transportation system; and after endeavoring, under a long succession of governors, to devise some means of keeping up the two plans of a convict colony and a free colony together, the government was obliged to yield, principally by the efforts of the "Anti-Transportation League" formed against its measures, and to issue an order in council in 1837 abolishing transportation to New South Wales, and restricting it to Van Diemen's Land; even here it was abolished in 1853. From this time the attention of the English was more and more attracted toward Australia, and explorations of the other coasts and even of the interior followed in rapid succession. In 1798 and 1799 Flinders and Bass, two Englishmen, carefully surveyed the S. and E. coasts. In 1800–'1 Grant and Murray explored the western part of the S. coast, and their work was continued both to the eastward and northward during the next three years by Baudin, Freycinet, and Flinders. During the period from 1788 to 1791, explorations in the interior were also undertaken by Phillip, Tench, and Dawes. In 1796 Hunter penetrated to the mountains called by his name. In 1813 Wentworth, Blaxland, and Lawson crossed the Blue mountain and discovered the Bathurst plains, which in 1815 became the seat of a branch colony. In the same year Evans explored the valley of the Lachlan. In the succeeding five years Jefferies, Kelly, and King completed the survey of the coasts. Oxley, who travelled through the eastern mountain system in 1818, Hovell and Hume, who explored the region of the Australian Alps from 1818 to 1824, and Cunningham, who spent the six years from 1823 to 1829 in the northern part of the same district, were the next noteworthy explorers. In 1828 and the years following Sturt made several expeditions of importance, and in 1829 he discovered the Darling river. In 1829 also was founded the second of the chief colonies—that which still bears the name of Western Australia. The first settlement was at Perth. In 1832 Bennett, and in 1835 and the succeeding year Major Mitchel, explored southern Australia, and the latter followed the Darling to its confluence with the Murray, besides discovering the Grampian hills, and making other noteworthy additions to the knowledge of the interior. In 1835 also the first settlement in the future colony of Victoria was made at Port Phillip. In the mean time several attempts to colonize other parts of the coast had failed; a settlement had been made in Arnhem's Land in 1824, and several others in subsequent years on the W. side of the island, but none of these endured more than a few years. In 1836, however, a successful colony was begun in South Australia, at Adelaide. In 1839 and the three following years Stokes made a series of important exploring expeditions along the coast. The interior, chiefly between the Pacific and the gulfs of Carpentaria and Spencer, was explored in the following three decades by those of Eyre, Leichhardt, Sturt, the brothers Gregory and Helpman, Kennedy, Austin, Stuart, Babbage, the brothers Dempster, Burke and Wills, Landsborough, McKinlay, Lefroy, McIntyre, Forrest, Brown, and others, several of whom became the victims of their zeal and boldness. Emigration to the newly founded colonies was very slow; large numbers of discouraged settlers left Australia for the South American coast or for other countries; and in 1850, after all the attempts made during 60 years of colonization, the European population was estimated at only 50,000. An event now occurred which suddenly changed the whole condition and prospects of the continent. This was the discovery of gold in 1851, in the Bathurst district of New South Wales, by a gentleman returned from California, Mr. Hargreaves. Count Strzelecki had previously announced the existence of gold in Australia, and Sir Roderick Murchison, examining a piece of Australian quartz, had inferred it from his knowledge of the gold washings in the Ural mountains. The discovery of gold in quantities on the Turon river, in New South Wales, early in the year, first drew a number of diggers to that district. In the latter end of 1851, however, diggings of far greater value were discovered in Victoria, and then commenced an influx of immigrants which, as in the case of California, produced results that set all foresight and calculation at defiance. In a year after the discovery the population was 250,000, notwithstanding the distance from Europe and the expense of the voyage. Ordinary busi-

ness of all kinds was momentarily suspended. Agriculture was for that year almost abandoned. Every article of food and clothing was imported from Europe, labor and merchandise advanced to prices to which there seemed to be no probability of a limit, and much time was required to bring Australian affairs into their ordinary channel. Among the industries which have grown up, the raising of sheep has the most prominent place. The great sheep runs, occupying immense tracts of land, have become a principal feature of the country. Merino and other fine breeds, imported early into the colonies, have increased with great rapidity—in Queensland alone from three to nine million head in the last ten years—and the statistics show the extraordinary amount of wool annually yielded, and nearly all exported.—The recent progress of the country has been uninterrupted and rapid. The era of speculation seems to have nearly passed away, and the affairs of the colonies are gradually assuming the settled aspect of those of older states. Explorations are constantly made in the interior, and the large tracts still unsettled near the coast are attracting a considerable immigration, which, now that the resources of the continent are properly developed, is not likely to be discontinued.—For more specific information, see the articles on the different colonies.

AUSTRASIA (old Ger. *Oesterrych*, *i. e.*, *Oestreich*), the eastern kingdom of the Franks of the 6th, 7th, and 8th centuries, under the Merovingians, comprising in its flourishing period the countries on both sides of the Rhine, from the Marne to the Saale and from the North sea to the Danube (the ancient kingdoms or duchies of Metz, Champagne, Thuringia, Alemannia, Frisia, and others). The first king was Siegbert, to whom this territory fell in 561 on the partition of the dominions of his father Clotaire I., king of the Franks. Austrasia was in conflict with Neustria, the western Frankish kingdom, and with the Burgundians. Among celebrated Austrasian rulers were Queen Brunehaut or Brunehilde (567–613), King Dagobert (628–'38), whose successors are called *les rois fainéants* (idle kings), and the mayor of the palace Pepin of Héristal, who was succeeded in 714 by his natural son Charles Martel. In 752 Charles's son Pepin the Short became sovereign of both the eastern and western Frankish kingdoms, and Austrasia ceased to play a distinct part in history. Under Charlemagne's successors most of the former Austrasian countries were merged into Germany, and those of Neustria into France.—See *Histoire du royaume mérovingien d'Austrasie*, by Haguenin (Paris, 1863).

AUSTRIA (Ger. *Oestreich* or *Oesterreich*, eastern empire), officially designated since 1868 as the Austro-Hungarian Monarchy, an empire of southern central Europe, bounded N. by the German empire and Russia, E. by Russia and European Turkey, S. and S. W. by Turkey, the Adriatic sea, and Italy, and W. by Switzerland and the German empire. It now consists of two main divisions, Austria proper and Hungary, each of which has its own special legislation and administration, though they are united under one monarch and have a single ministry for all matters of common interest. As the river Leitha constitutes a part of the frontier, Austria is also called Cisleithania, and Hungary Transleithania. But while in the higher political sense the Austro-Hungarian monarchy consists of these two divisions, the term is in fact the collective designation of several states, comprising a number of distinct nationalities, all under the rule of the house of Hapsburg. It is only since the accession to the throne of the emperor Francis Joseph that these countries have been actually consolidated. The centralizing policy of the crown was, however, partly defeated by the resistance of the Hungarians, who demanded and finally obtained the recognition of the historical rights of the Hungarian monarchy. In this article we shall treat only of the Austro-Hungarian monarchy as a whole, and of the Cisleithan half of the empire. For the rest, see Hungary.—The total area of the empire is 240,381 sq. m., extending from lat. 42° 10′ to 51° 4′ N., and from lon. 9° 35′ to 26° 35′ E. Its population, according to the census of 1869, amounted to 35,904,435. The empire is a continuous territory, only two districts (Cattaro and Ragusa) being separated from the main body by small strips of Turkish territory. Of the 21 states or provinces (*Kronländer* or crown lands) which, according to the reorganizing statutes of 1849 and 1851, were to constitute the united Austrian monarchy (*Oestreichische Gesammtmonarchie*), the following 14, according to the new arrangement made in 1867, belong to the "countries represented in the Reichsrath," or to the Cisleithan provinces: 1, the archduchy of Lower Austria (*Oestreich unter der Enns*), 7,655 sq. m., pop. 1,990,708; 2, the archduchy of Upper Austria (*Oestreich ob der Enns*), 4,633 sq. m., pop. 736,557; 3, the duchy of Salzburg, 2,767 sq. m., pop. 153,159; 4, the duchy of Styria (*Steiermark*), 8,671 sq. m., pop. 1,137,990; 5, the duchy of Carinthia (*Kärnthen*), 4,006 sq. m., pop. 337,694; 6, the duchy of Carniola (*Krain*), 3,857 sq. m., pop. 466,334; 7, the Coastland or Littorale, embracing the counties of Görz and Gradisca, the margraviate of Istria, and the district of Trieste, 3,085 sq. m., pop. 600,525 (the three last-named provinces form the kingdom of Illyria); 8, the county of Tyrol with Vorarlberg, 11,325 sq. m., pop. 885,789; 9, the kingdom of Bohemia (*Böhmen*), 20,064 sq. m., pop. 5,140,544; 10, the margraviate of Moravia (*Mähren*), 8,585 sq. m., pop. 2,017,274; 11, the duchy of Silesia (*Schlesien*), 1,988 sq. m., pop. 513,352 (these 11 states were until 1866 members of the German confederation); 12, the kingdom of Galicia, including the former republic of Cracow (annexed by Austria in 1846), and the duchies of Auschwitz and Zator, both of

which belonged until 1866 to the German confederation, 30,313 sq. m., pop. 5,444,689; 13, the duchy of Bukowina, 4,036 sq. m., pop. 513,404; 14, the kingdom of Dalmatia, 4,940 sq. m., pop. 456,961. Total area of the 14 provinces represented in the Reichsrath, 115,925 sq. m.; total population, 20,394,980. This includes 177,449 soldiers, deducting whom the civil population amounts to 20,217,531. The aggregate population of these 14 provinces in 1830 was 15,588,142; in 1850, 17,534,950; in 1857, 18,224,500. At the close of the year 1871 the civil population was officially calculated at 20,555,370. Of the remaining seven provinces, Lombardy and Venetia have been ceded to Italy in consequence of the wars of 1859 and 1866; and the kingdom of Hungary, the kingdom of Croatia and Slavonia, the waywodeship of Servia, the grand duchy of Transylvania, and the Military Frontier now belong to the lands of the Hungarian crown (the waywodeship of Servia having however ceased to be a separate crown land and been incorporated with Hungary proper).—About five sevenths of the Austrian territory are mountainous. There are three principal chains of mountains, each of them sending off many branches, viz.: 1. The Alps (Rhætian, Noric, Carnic, Julian, and Dinaric), covering almost the entire southern belt of the German provinces, as well as Illyria and Dalmatia (see Alps); their highest peaks are the Ortler (12,852 ft.) and the Gross-Glockner (12,776 ft.). 2. The Carpathians, about 800 m. long, beginning at the confluence of the Danube and the March, near Presburg, sweeping in an arc to the confluence of the Danube and Cserna, on the confines of Wallachia and Servia. (See Carpathian Mountains, and Hungary.) The bold and rugged granite cliffs of the Carpathians, in N. Hungary and E. Transylvania, rise to a height of more than 8,000 ft. above the level of the sea. 3. The Sudetic mountains, with the Bohemian forest and the Ore mountains (Erzgebirge, between Bohemia and Saxony), forming together an almost uninterrupted chain of granite and gneiss formation. The highest section of this chain, the Giant mountains or Riesengebirge, between Bohemia and Prussian Silesia, rises in the Schneekoppe, or Snow peak, to an elevation of upward of 5,000 ft. above the level of the sea. Besides these three great chains there are several parallel ranges of considerable height. Thus on both sides of the Alps there extend limestone ranges, the northern ones towering up to the height of 9,840 ft. (the Dachstein, or Roof peak, on the boundary line of Salzburg and Styria), while the southern ones, reaching to the height of 10,903 ft., cover nearly the whole territory of Illyria and Dalmatia. Again, the Carpathians are surrounded by sandstone mountains, which almost fill up the territory of Transylvania. Of large plains there are only two: the great Hungarian basin, covering about 40,000 sq. m., and the Galician basin, which is interrupted by several ranges of hills and covers about 20,000 sq. m.—The seacoast of Austria extends from the head of the gulf of Venice to the S. point of Dalmatia, on the E. side of the Adriatic, 1,036 m. Austria belongs to four of the great river systems of Europe, those of the Black sea, the Baltic, the German ocean, and the Mediterranean. Among the numerous streams the Danube is by far the most important; it is, in fact, the main artery of the Austrian empire, and may at no very distant period become for a large portion of southern Europe what the Mississippi is for the United States. The Danube, being the largest European river after the Volga, enters Austria from Bavaria as a stream navigable at all seasons, but its channel formerly offered serious impediments to navigation, all of which have been removed or are in process of removal. (See Danube.) Steamboats were first introduced on the Danube in 1830. Since 1835 the Austrian steam navigation company has increased their number from year to year, until in 1869 it maintained 146 steamboats and propellers, besides 550 barges, scows, &c. The entire length of the Danube in Austria is nearly 900 m., and its average width 600 ft. Most of its tributaries are navigable for small craft, and steam has been introduced on several. The river Theiss, in Hungary, the most considerable of them all, said also to have a greater abundance of fish than any other European river, is navigated by steamboats from Tokay down to the Danube; it has a length of upward of 600 m. The Save, which enters the Danube near Belgrade, is navigable for a large part of its course. Steamboats also ply on the Inn, on the Bavarian frontier, and since 1857 even on the Salzach, a smaller stream, emptying into the Inn. The other important tributaries of the Danube, in their geographical order, are the Traun, the Enns, the March or Morava, the Raab, the Waag, the Neutra, the Gran, the Eypel, and the Drave or Drau, all of which are navigable. The Moldau, tributary to the Elbe, in Bohemia, is also navigated by steamboats. The Vistula, Dniester, and Pruth rise within the Austrian empire in Galicia, the Elbe in Bohemia, and the Adige in Tyrol.—The lakes of Austria are numerous, though not very large. The Platten or Balaton lake in S. W. Hungary has a surface of about 400 sq. m. The only salt lake in Austria is the Neusiedler lake in W. Hungary, nearly 20 m. long, and from 5 to 7 m. wide. The Czirknitzer lake, in Carniola, is remarkable as containing a number of subterranean cavities, through which its waters from time to time disappear and again flow in.—The climate of Austria is temperate and very wholesome. From the southern boundary up to lat. 46°, the average temperature is 54½° F.; from lat. 46° to lat. 49°, it is 50° to 52°; beyond lat. 49° it is 48°. The winter is very severe in the mountainous districts, but sudden changes of temperature are not frequent.—Nature has endowed Austria with a greater variety of productions

than any other European state. Platina excepted, all metals abound. Gold is produced in Hungary and Transylvania; silver and the best quality of European copper in Hungary; quicksilver in Carniola (the mine at Idria used to yield 12,000 cwt. per annum); tin in Bohemia; lead in Carinthia; iron almost everywhere (a single mine in Styria yields over 15,000 tons annually). The following are produced in smaller quantities: zinc (about 44,000 cwt. in 1869), arsenic (1,376 cwt.), antimony (11,786 cwt.), chrome, bismuth, and manganese. Black tourmaline, alabaster, serpentine, gypsum, black lead, slates, flint, and marble abound in many portions of the empire. The precious stones found in Austria are: the Bohemian carbuncle, the Hungarian opal, chalcedony, ruby, emerald, jasper, amethyst, topaz, carnelian, chrysolite, beryl. The coal beds of Austria are considered almost inexhaustible. Of rock salt there is a bed several hundred miles in length in Galicia, of which only a small portion is worked at the gigantic mine of Wieliczka, near Cracow, a perfect subterranean city, or rather four cities, one below the other, extending in a labyrinth of galleries, and hewn into the salt rock 9,500 ft. from N. to S., and 3,600 ft. from E. to W. Of mineral springs Austria contains upward of 1,600, of which the most celebrated are at Carlsbad, Marienbad, Teplitz, and Franzensbad, in Bohemia; Ischl, in Upper Austria; Baden, in Lower Austria; Gastein, in Salzburg; Gleichenberg, in Styria; Bartfeld, Trentschin, and Parád, in Hungary; Mehadia, in the Military Frontier district.—The vegetable kingdom of Austria shows the same variety as the mineral. Wheat is the staple produce of the German provinces and of Hungary; buckwheat is raised in the sandy regions; Indian corn, rice, and kidney beans are raised in Hungary; the finest varieties of apples and pears in Bohemia, Austria proper, and Tyrol; of plums, in Hungary. Hungary produces immense quantities of cucumbers, melons, watermelons, pepper, anise, licorice, poppies, chiccory, sweet-flag, ginger, flax, hemp, and tobacco. Cotton is raised in Dalmatia, hops in Bohemia, saffron and woad in Lower Austria. The Hungarian wine (more than one half of the entire wine product of Austria) is an excellent article, some brands being justly counted among the very best wines of the world (Tokay, Ménes, &c.). About 68,000 sq. m. of the Austrian territory are covered with forests, mostly oak, pine, and hemlock, in the northern, and maple, stone pine, olive, laurel, myrtle, and chestnut trees, in the southern provinces. Horses are raised everywhere, but only those of the Bukowina are of a superior stock; sheep and horned cattle in Hungary and Galicia (buffaloes in Croatia and Transylvania); goats and hogs in Hungary. The silkworm has been introduced in Tyrol, Croatia, Slavonia, Illyria, and Dalmatia. Game is plentiful, deer, wild boars, and hares being found almost everywhere; black bears, chamois, lynxes, wolves, and beavers, only in some districts. Pearl mussels are frequently found in several rivers and creeks of Hungary.—The increase of the population of the Austro-Hungarian monarchy from 1850 to 1869 has been on an average 0·84 per cent. According to the general census of 1857, the monarchy had 37,754,856 inhabitants. Since then it has lost two provinces, Lombardy and Venetia, with a population of about 5,000,000; but the natural increase from 1857 to 1869 has nearly made up this loss. The inhabitants of the empire live in 927 cities, 2,039 boroughs, and 73,252 villages. Of the cities, one (Vienna) has upward of 600,000 inhabitants; two, Pesth and Prague, have more than 150,000; 12 above 40,000; 6 above 30,000; 35 above 20,000; and 97 above 10,000. In no country in the world has the nationality question at present so great a political importance as in Austria. No official census of the nationalities has been taken since 1850. The following estimates of the strength of all the important nationalities of the empire in 1869 is taken from Schmitt's *Statistik des österreichisch-ungarischen Kaiserstaates* (4th ed., 1872):

NATIONALITIES.	Total number in Cisleithania.	Per cent. in Cisleithania.	Tot'l numb'r in Transleithania.	Per cent. in Transleithania.	Total number in Monarchy.	Per cent. in Monarchy.
Germans	7,108,900	35·16	1,894,800	12·30	9,003,700	25·27
Czechs and Slovaks	4,718,800	23·34	1,841,100	11·95	6,559,900	18·41
Poles	2,443,500	12·09	.....	....	2,443,500	6·86
Ruthenians	2,584,600	12·80	448,000	2·91	3,032,600	8·51
Slovens (or Winds)	1,196,200	5·92	58,000	0·37	1,254,200	3·52
Croats and Serbs	522,400	2·58	2,405,700	15·60	2,928,100	8·22
Magyars	17,700	0·09	5,688,100	36·89	5,705,800	16·01
Italians	587,500	2·91	600	....	588,100	1·66
Roumans	207,900	1·02	2,477,700	16·08	2,685,600	7·54
Jews	820,200	4·05	552,100	3·58	1,372,300	3·86

Of the Cisleithan provinces only Upper Austria and Salzburg are wholly German; in the other provinces the numerical relation of the principal nationalities, according to the same authority, was in 1869 as follows: Lower Austria—Germans 90 per cent., Czechs 6; Styria—Germans 63, Slovens 36; Carinthia—Germans 69, Slovens 31; Carniola—Germans 6, Slovens 93; Littorale—Germans 4, Slovens 42, Croats 21, Italians 31; Tyrol—Germans 60, Italians 39; Bohemia—Germans 38, Czechs 60; Moravia—Germans 26, Czechs 71; Silesia—Germans 51, Czechs 19, Poles 29; Galicia—Germans 3, Poles 42, Ruthenians 44, Jews

11; Bukowina—Germans 7, Ruthenians 40, Roumans 39, Jews 9; Dalmatia—Croats and Serbs 87, Italians 13. Thus the Germans may always be expected to control, when the nationality question is at stake, the provincial diets of Upper and Lower Austria, Styria, Salzburg, Carinthia, and Silesia. The Czechs prevail in Bohemia and Moravia, the Slovens (or Winds) in Carniola, the Croats and Serbs in Dalmatia. In Galicia, according to the above table, the Ruthenians exceed the Poles in number; but the Poles, to whom the higher classes of society belong, have an undisputed control of the diet, and in general of the province as a whole. The Germans, though only 35 per cent. of the population of the Cisleithan provinces, are the ruling race in this part of the monarchy, while the Magyars dominate in the lands of the Hungarian crown, although they likewise embrace no more than about 37 per cent. of the entire population. The number of languages or dialects spoken in Austria exceeds 20, but German is the highest official language in the Cisleithan, and Magyar in the Transleithan provinces. It is a significant fact that at a Panslavic congress held at Prague in 1848, the delegates of the different Slavic nationalities found themselves under the necessity of using the German language, being unable to understand the different dialects of their own tongue. The density of population is very unequal, but is generally greater in the eastern than in the western portions of the empire. The extremes are Lower Austria, which contains Vienna (259 to the sq. m.), and Salzburg (55 to the sq. m.).—More than three fourths of the entire population of Austria acknowledge the religious supremacy of Rome; of these, in 1869, 23,954,233 were Roman Catholics proper, 3,941,796 United Greeks, and 8,279 Armeno-Catholics. The population connected with the Greek Oriental church amounts to 3,050,830; and that belonging to the Armenian proper (Gregorian) to 1,854. The Reformed church has 2,143,178 professors; the Lutheran, 1,365,835; the Unitarians, 55,070. The Jews number 1,372,300. The remainder belong to minor sects. The Roman Catholic church in Austria has 11 archbishoprics and 42 bishoprics; 2 archbishoprics and 7 bishoprics belong to the United Greek, and 1 archbishopric to the Armeno-Catholic. The Greek Oriental church has 3 archbishoprics and 10 bishoprics. In 1869 the number of Roman Catholic convents in Austria was 965, containing 8,743 monks and 5,671 nuns. By the concordat with the pope, concluded in September, 1855, the Roman Catholic church in Austria received great prerogatives; but these were rescinded by the reform laws of 1868, and in consequence of the promulgation of papal infallibility as a doctrine of the church, the Austrian government in 1870 declared the concordat abrogated. The affairs of the Lutheran and Reformed churches are administered in the Cisleithan provinces by the evangelical supreme church council at Vienna and two general synods, one Lutheran and one Reformed. The Lutheran church is divided into 4 superintendencies and subdivided into 15 seniorates; the Reformed church consists of 4 superintendencies, which are divided into 6 seniorates. The Jews have about 500 rabbis in the entire monarchy.—Public education has been in the course of thorough reorganization since 1848. In the Cisleithan provinces, it is chiefly regulated on the basis of the law of May 14, 1869. The number of common or primary schools has been steadily increased, until in 1869 it was 31,218, or one for every 1,159 inhabitants. The common schools are of two grades. In those of the lower grade reading, writing, ciphering, religion, the elements of history and natural history, singing, and gymnastic exercises are taught; in those of the higher grade (*Bürgerschulen*), composition, arithmetic, geometry, bookkeeping, and drawing are added. In 1869, 2,852,843 children out of 3,624,295 went to the common schools. Education is compulsory, and in the Cisleithan provinces children are bound to attend school from their 6th to their 14th year. Nearly all the children of this age attended school in 1869 in Upper and Lower Austria, in Salzburg, Styria, Tyrol, Bohemia, Moravia, and Silesia; but in Galicia, Bukowina, and Dalmatia, only one out of three children received an education. The number of normal schools for the education of teachers was for the whole empire about 100. The middle schools (*Mittelschulen*) are divided into *Gymnasien* (colleges), which prepare their pupils for the universities; *Realschulen*, which prepare them for the technical high schools; and *Realgymnasien*, recently instituted, which combine both courses. The monarchy in 1870 had 241 gymnasien, 20 realgymnasien, and 74 realschulen; the Cisleithan provinces 99 gymnasien, 19 realgymnaisen, and 49 realschulen. In 1871 Austria had 7 universities (Vienna, Prague, Pesth, Lemberg, Innspruck, Gratz, and Cracow), to which in 1872 a new one was added at Klausenburg in Transylvania, and 8 technical high schools (*Technische Hochschulen*), most of which have been recently reorganized so as to comprise a number of special schools. The universities in 1870 had 707 professors and 10,877 students; the technical high schools, 265 professors and 3,010 students. To the last-mentioned class of institutions may be added 2 mining academies, 1 agricultural academy, 4 commercial academies, and the academy for commerce and navigation at Trieste. Not included in the above statement are a number of special schools for theology, for law and political economy, for surgery, midwifery, and veterinary surgery, for commerce, trade, and navigation, for agriculture, for mining, the art schools, the schools for the education of military officers, and a large number of private schools. The largest of the public libraries are the imperial library at Vienna, numbering 410,000 volumes; the university library at Vienna, containing up-

ward of 200,000 vols.; the university libraries of Pesth, Cracow, and Prague; and that of the national museum of Pesth. There are many museums, cabinets of science and art, galleries of paintings, &c., in the principal cities of the empire. Several splendid collections belonging to private individuals are always open to the public.—Before 1848 the most rigorous censorship rendered a well regulated public press an impossibility. During the revolution in 1848 these restraints were removed, but in 1852 a law for the regulation of the press gave the police absolute control over the political press, and restored the censorship in all but the name. In 1862 the government again found it necessary to grant freedom of the press; and after the reorganization of the empire in 1867, it was again confirmed by a law of Oct. 15, 1868. In 1870 there were published in Austria 185 political newspapers and 578 non-political. Of the former, 100 are in German, 17 in Bohemian, 11 in Polish, 5 in other Slavic languages, 11 in Italian, 32 in Hungarian, 4 in Roumanian, 2 in Greek, 2 in Hebrew, and 1 in French; of the latter, 336 in German, 121 in the Slavic languages, 20 in Italian, 91 in Hungarian, 5 in Roumanian, 3 in Hebrew, 1 in Latin, and 1 in French. Some of the large daily papers published in Vienna and Trieste are among the best and most influential of the continental journals.—In 1869 the number of public hospitals in Cisleithan Austria was 408; of lunatic asylums there were 15; lying-in establishments, 19; foundling hospitals, 15; institutions for the sustenance of old and indigent persons, 979; poorhouses, 6,648. The number of foundlings provided for by the government exceeds 65,000. The immense hospitals of Vienna, established by Joseph II., are perhaps the best regulated in the world. There are besides a number of hospitals connected with the convents, where over 20,000 persons are relieved annually, without distinction of creed or nationality. In the military hospitals 181,976 persons were received in 1869. Every provincial capital has an imperial loan office for the poor, the profits of which are made over to the treasury of the almshouse department.—The total value of the mineral produce of Austria in 1869 was set down at 89,415,465 florins (the florin is equal to 47 cents). Of this sum, more than one third (32,446,603) was the value of the salt produced. The yield of the gold mines in 1869 was 56,752 oz., that of the silver mines 1,339,712 oz., that of copper 53,957 cwt., of lead 102,000 cwt. The total quantity of salt produced in 1869 was as follows: rock salt, 3,872,424 cwt.; spring salt, 2,804,823; sea salt, 77,571; industrial salt, 861,988. The most remarkable increase has taken place in the production of iron and coal. The latest statistics, published in 1869, showed the production of raw or pig iron to be 6,087,830 cwt., and that of cast iron 753,563. The coal produced in Austria, which in 1838 netted only some 4,000,000 cwt., and in 1854 and 1855 full 30,000,000, in 1869 reached 146,000,000 cwt.—The Austrian empire may, as regards its agriculture, be divided into four sections: 1, the Alpine countries—Austria proper, Salzburg, Tyrol, Carniola, Carinthia, Styria, and the Littorale; 2, the eastern provinces—Hungary, Croatia, Slavonia, the Military Frontier, and Transylvania; 3, the northern provinces—Moravia, Bohemia, Silesia, Galicia, and Bukowina; 4, the southern province of Dalmatia. In the Alpine countries the density of the population compels the farmer to till even the steepest hillsides. The narrow plains yield potatoes, barley for brewing, and fodder; on the sunny sides of the mountains the grape is cultivated extensively. The production of breadstuffs in these countries is not equal to the consumption. The agricultural condition of those portions of the eastern provinces covered by the Carpathian mountains is similar to that of the Alpine countries; but the scanty products of these territories are largely made up by the surplus of the level country, which, with very few exceptions, is of extraordinary fertility, especially in the river bottoms. A large portion of the pasture land is entirely capable of cultivation, and would be put under plough but for want of labor. The most fertile regions, although thinly populated, produce a large surplus for exportation to the Alpine countries. The extensive pastures are used for cattle-raising. Draught cattle are exported to nearly all adjoining regions; beef cattle mostly to the Alpine provinces. Hog fattening is carried on upon a very large scale. The Hungarian wine and tobacco are noted for their excellent quality. In the northern provinces but few places are adapted to the culture of the grape. Moravia, belonging to the basin of the Danube, has some large and fertile plains, but Bohemia is hilly to a great extent, Silesia entirely so, while Galicia, descending as it does from the Carpathians to the courses of the large streams, shows every variety of formation. Grain and potatoes are the staple produce of these countries, supplying the domestic demand. Breweries, distilleries, and beet sugar factories are numerous in these provinces. The following table shows the area in square miles of the productive soil, and of the arable, wine, meadow, pasture, and wood land, both of the Cisleithan provinces and of the entire monarchy, in 1869:

	Cisleithania.	Entire Monarchy.
Arable land	37,736	75,798
Wine land	792	2,259
Meadows and gardens	15,020	30,972
Pastures	18,062	34,486
Woodland	35,252	68,416
Productive soil	106,862	211,931
Unproductive soil	9,062	28,450
Total	115,924	240,381

The aggregate value of the agricultural produce of Austria was estimated in 1857 by Herr von Kleyle, assistant secretary of state, at 2,500,000,000 fl., and in 1871 by Prof. Brachelli at 2,400,000,000 fl. The government of Francis Joseph has endeavored to promote agriculture and cattle-breeding by agricultural fairs, exhibitions of implements, premiums for improved stock, the introduction of new branches of agriculture, and other measures; and particular attention has been paid to the American improvements of agricultural implements and machinery. The culture of some American plants has also been introduced, broom corn among others. The number of horses in Austria in 1869 was 3,578,513; of horned cattle, 12,515,212; of sheep, 19,905,398; of goats, 1,569,104; of swine, 7,051,473.—Austrian manufactures, whose existence may be said to date only from the reign of Joseph II., are now striving to rival those of every other European nation, England excepted. The number of hands employed in the manufacturing establishments in 1869 was 2,273,316; the value of their annual produce, 1,500,000,000 fl. Of this sum, 80,000,000 fl. is the estimated value of the iron ware, 50,000,000 that of chemical preparations, and 20,000,000 that of glassware and looking glasses (equal in quality to the French). Hemp and flax are manufactured into goods worth 150,000,000 fl. The value of the woollen fabrics is upward of 140,000,000 fl. The number of cotton spindles in Austria in 1870 was 1,581,000; the total value of cotton goods produced, 120,000,000 fl. The quantity of cotton manufactured in Austria in 1850 was five times as large as in 1831. Since then the progress of this branch of industry has been comparatively slow. The manufacture of tobacco is monopolized by the government (the monopoly having been extended over Hungary, which formerly was excepted from it, in 1850). The most numerous and extensive industrial establishments are in Austria proper (chiefly in Vienna) and Bohemia, the fewest and smallest in Dalmatia and the Military Frontier. There are three principal centres of industry: Vienna, for the manufacture of all objects of luxury and musical instruments; Moravia, Silesia, and Bohemia, for linen and woollen fabrics and glassware; Styria and Carinthia, for iron goods and hardware. The government endeavors to promote the growth of Austrian industry by establishing schools of mechanical arts, trade unions, industrial exhibitions, &c. In order to encourage inventors, the patent laws were entirely remodelled in 1852.—The commerce of Austria has since 1816 gradually grown into importance, although crippled until 1850 by a prohibitory tariff, and by the political organization of the empire, being at that time merely a dynastic union of different states, rendering the provincial boundary lines so many barriers against internal intercourse. At an early period the Austrian government took care to spread a perfect network of excellent commercial roads over the whole empire. The roads over the Alps, the Stilfser Joch, the Splügen, the Semmering, and others, are justly counted among the most remarkable works of modern times. The first railway in Germany was built on Austrian territory, connecting Budweis and Linz (1832). The aggregate length of railroads (inclusive of horse railroads), on Jan. 1, 1871, was 6,324 m. Telegraph lines have been constructed in all directions. In 1870 there were in Austria 16,564 m. of electro-magnetic telegraph, with an aggregate length of wires of 50,876 m. The number of post offices in all Austria was 4,767. The most important canal for commerce is the emperor Francis's canal, connecting the Danube and Theiss, and saving a circuit of 220 m. On July 1, 1851, the customs line between Austria proper and Hungary was abolished; on Feb. 1, 1852, a new tariff was published, by which the protective system was introduced in lieu of the previous prohibition, which was now limited to three articles of government monopoly, viz., salt, gunpowder, and tobacco. In 1852 the river duties on the Elbe, Po, and Danube were abolished. A postal union was concluded with most of the German states in 1850, and was followed in 1853 by a commercial treaty between Austria and the German Zollverein. On April 11, 1865, a new customs and commercial treaty was concluded with the German Zollverein, which, by considerable reduction of duties and the establishment of uniformity of regulations, greatly increased the commerce of Austria with the states of the Zollverein. Other important commercial treaties were concluded with the United States, Mexico, Persia (1857), Turkey (1862), Great Britain (1865 and 1869), France (1866), Belgium (1867), the Netherlands (1867), Italy (1867), the states represented in the German Zoll parliament (1868), and Switzerland (1868). Chambers of commerce and industry were introduced in Austria in 1850. Their rights and functions in the Cisleithan provinces were regulated by the law of June 29, 1868. In 1871 there were in Cisleithan Austria 42 chambers. According to a treaty concluded in 1867 between the governments of Cisleithania and Hungary, both these divisions of the empire constitute with regard to customs and commercial intercourse one territory, encircled by one customs boundary line, from which are only excluded Dalmatia, which constitutes a customs territory by itself, Istria and the Quarnero islands, the free ports of Trieste, Buccari, Zengg, Portoré, Carlopago, the town of Brody in Galicia, and the commune of Jungholz in Tyrol. The commercial intercourse between the two divisions according to this treaty is entirely free, and the goods carried from the one into the other can be subjected to only those burdens which may be imposed upon the products of the producing division itself. All treaties with foreign powers regulating commercial relations are concluded by the imperial government for both divisions of the empire.

Among the large moneyed institutions the Austrian national bank of Vienna (established in 1816) maintains the highest rank, although its importance is much more due to its intimate connection with the financial administration of the empire than to its commercial transactions. In 1869 it had 23 branches, nine of which were in the lands of the Hungarian crown. A most powerful institution is the Austrian Lloyd, at Trieste, a joint-stock company established by Von Bruck in 1833, and unrivalled in the variety of its enterprises. It is divided into three sections: one devoted to the insurance business and the collection of statistics for the maritime trade, the second (established in 1857) to ocean-steamship navigation, the third (established in 1849) to the promotion of literature and art. This company has gradually been developed into gigantic proportions, almost monopolizing the Levant trade on the eastern portion of the Mediterranean. It has established regular steamship lines between Trieste and almost every port on the Adriatic, Ægean, and Black seas. The number of its steamships in 1853 was 56; in 1870, 70. Another great institution is the Danube steam navigation company. The first river steamboat in Europe built on the American pattern was built for this company in 1854. Early in 1856 the *Credit-Anstalt* at Vienna, an imitation of the Paris *société de crédit mobilier*, went into operation, the subscription to its stock having reached the enormous amount of 640,000,000 florins, or upward of $300,000,000; but the strong impulse given by this institution to speculation and stock-jobbing led at the beginning of the year 1857 to a violent financial revulsion. An extraordinary impulse was given to the development of large moneyed institutions in 1862 and the following years. The *Statistisches Jahrbuch für das Jahr* 1870 (Vienna, 1872) enumerates 44 institutions of this kind in the Cisleithan provinces, all of which, with the exception of five, were established after 1862, and no fewer than 21 in 1869. The aggregate paid-up capital of these institutions amounted in 1870 to 231,800,000 florins. The following institutions had the largest capital: Austrian National bank, 90,000,000 fl.; Austrian Credit Institution, 40,000,000; Austrian Land Credit Institution (established in 1864), 9,000,000; Anglo-Austrian bank (1863), 14,000,000; Franco-Austrian bank (1869), 8,000,000; Austro-Egyptian bank (1869), 4,000,000; Union bank (1870), 12,000,000. The number of savings banks in the Cisleithan provinces at the close of 1870 was 184, with deposits amounting to 285,300,000 fl. The total value of the commercial movement of Austria (exclusive of precious metals) in 1870 is shown as follows:

	Imports.	Exports.
	Florins.	Florins.
Austro-Hungarian Customs Territory	416,100,000	389,200,000
Customs Territory of Dalmatia	8,600,000	6,700,000
Total	424,700,000	395,900,000

In 1869 the imports into Austria from the German states represented a value of 301,900,000 fl.; the exports from Austria into the German states, 241,000,000 fl.—The development of the shipping of Austria since 1841 is shown by the following table:

YEARS.	Vessels.	Tons.	Men.
1841	5,574	215,598	27,386
1849	6,083	259,583	.....
1856	10,006	380,469	36,802
1871	7,848	375,822	28,244

Of these 5,767, carrying 267,134 tons, were ocean vessels; 91, carrying 49,977 tons, and 17,749 horse power, steamships. The apparent decrease during the period from 1856 to 1871 is due to the loss of the Italian provinces. In 1870 the maritime commerce of Trieste amounted to 226,290,000 fl., viz.: imports, 125,870,000; exports, 100,420,000. Trieste is by far the most important seaport of Austria, and, besides Marseilles, perhaps the only one on the European continent which has advanced at a very remarkable rate. The following table shows the most important among the other ports of the empire:

PORTS.	Entries in 1869.	Tons.
Pola	2,583	260,489
Zara	828	191,887
Curzola	640	160,791
Pirano	2,646	139,566
Lussin Piccolo	1,250	129,198
Fiume	2,720	126,004
Spalato	1,934	119,106
Gravosa	633	105,196

—The fundamental law which divides the monarchy into two states or divisions bears the date of Dec. 21, 1867. According to this law, each of the two divisions (the "countries represented in the Reichsrath" and the "countries of the Hungarian crown") has its own constitution, but they are united under the same monarchy and have in common an imperial ministry (*Reichsministerium*) for the administration of those affairs which have been constitutionally defined as common to both parts of the empire. Such are the foreign affairs, nearly the whole department of war, inclusive of the navy, and the finances of the joint monarchy. Several other subjects, though not defined as common affairs, are to be equally treated according to principles from time to time agreed upon by the two legislatures. In this class belongs legislation on duties, on certain indirect taxes, and on railways in which both divisions are interested. For the countries represented in the Reichsrath the following fundamental laws are specially recognized as valid: 1, the "Pragmatic Sanction" of the emperor Charles VI. of Dec. 6, 1724, which regulates the order of succession and declares the indivisibility of the empire; 2, the diploma of Francis Joseph I. of Oct. 20, 1860, which introduces the constitutional form of government; 3, the six fundamental laws of

Dec. 21, 1867, regulating the representation of the people, defining the general rights of citizens, the judicial, administrative, and executive power, and appointing an imperial court (*Reichsgericht*). The Austro-Hungarian monarchy is an empire hereditary in the Hapsburg-Lorraine dynasty. After the entire extinction of the male line, the crown may be inherited by female descendants. The emperor attains his majority when 18 years old, and must belong to the Roman Catholic church. On entering upon the government, he must take an oath to support the constitution. He is addressed as imperial and royal apostolical majesty, and has three different titles, the shortest of which is emperor of Austria, king of Bohemia, &c., and apostolical king of Hungary. The emperor shares the legislative power with the representative assemblies of Cisleithania and of Hungary, and with the provincial diets. Without the consent of these bodies no law can be made, altered, or abolished. With regard to the affairs common to the whole empire, the Austrian Reichsrath and the Hungarian diet exercise their legislative rights through two delegations, consisting each of 60 members, one third chosen from the upper and two thirds from the lower house. The delegations serve only one year, and meet alternately at Vienna and at Pesth. The members of the imperial ministry for the common affairs of the empire, namely, the ministers of foreign affairs, of war, and of the imperial finances, are responsible to the delegations. The Reichsrath of the Cisleithan provinces consists of a house of lords (*Herrenhaus*) and a house of deputies (*Abgeordneten-Haus*). The upper house embraces all imperial princes who are of age, the chiefs of a number of noble families who have been declared hereditary members of the house, all the archbishops and prince-bishops, and an unlimited number of distinguished men whom the emperor may appoint as life members. The house of deputies in 1872 consisted of 203 members, chosen by the provincial diets from their own members for a term of six years. Their term ceases sooner, however, if they cease to be members of the provincial diet. If a provincial diet does not send delegates to the Reichsrath, the emperor has the right to order direct elections. The provincial diets exercise a legislative right with regard to subjects which have not expressly been reserved for the Reichsrath. These diets consist of the archbishops and bishops of the province, of the rector of the university, and of delegates chosen by the holders of large estates, by towns and other places, by the chambers of commerce and industry, and by the rural communities. Both the Reichsrath and the provincial diets are convoked annually. The ministers of Cisleithania are responsible to the Reichsrath, which may impeach them. The decision in such a case is given by a special state court organized by the Reichsrath. Every citizen 30 years of age is eligible to the provincial diet, but the right of voting is made contingent on the payment of a tax, the amount of which is fixed by law. The particular ministry of Cisleithania consists of seven sections, namely: interior, worship and education, commerce, agriculture, the defence of the country, justice, and finances. The provinces or crown lands are governed by governors (*Statthalter*), or provincial presidents (*Landespräsidenten*). Municipal officers are elected in accordance with the imperial law of March 5, 1862, by citizens possessing a certain amount of property and paying a certain amount of taxes. The administration of justice was reorganized in 1851, and again by the fundamental laws of 1867. All privileged jurisdiction has been entirely abolished. There are three degrees of jurisdiction. The district courts and district collegiate courts (894 in 1869) have original jurisdiction in civil suits up to a certain value, and in petty criminal cases, and the county courts (*Landesgerichte*), of which there were 62 in 1869, have original jurisdiction in all other civil cases and in all criminal cases; they have also appellate jurisdiction in cases tried by the district courts. Offences of the press are, according to the law of March 9, 1869, tried by juries. The provincial courts (*Oberlandesgerichte*), of which there are 9 in Cisleithania, are the courts of last resort for cases tried by the district courts, and of second resort for civil cases tried by the county courts. The highest tribunal of the monarchy is the court of appeals (*Oberster Gerichts- und Cassationshof*), at Vienna. The civil law is administered according to the code of 1811. The criminal code of 1804 was amended in 1852. The number of persons sentenced for crime in Cisleithan Austria in 1869 was 25,665, or 1 for every 787 of the population.—The finances have at all times been the sore point of the Austrian administration. Having been utterly prostrated by the Napoleonic wars, their condition was slowly improving when the revolutions of 1848, and the consequent wars in Italy and Hungary, again brought Austria near the verge of bankruptcy. The government paper currency fell some 20 per cent. below par. The prospect had begun to brighten when the eastern war and the position of armed neutrality maintained by Austria once more destroyed every hope of bringing the income and the expenditure to balance each other. The income has been steadily increasing, but so has the expenditure. By keeping a separate account

YEARS.	Income.	Expenditure.	Deficiency.
	Florins.	Florins.	Florins.
1848....	121,819,615	186,679,486	64,857,871
1849....	144,013,758	289,468,048	145,454,290
1850....	191,296,457	268,458,060	77,161,603
1851....	223,252,088	278,420,470	55,168,432
1853....	237,136,993	293,960,628	56,823,635
1854....	245,333,724	294,529,681	49,195,957
1856....	268,508,796	321,377,664	52,868,868
1862....	398,657,965	510,359,852	111,701,887
1866....	495,004,238	535,143,384	40,139,146

of the "extraordinary expenditure," the Austrian government organs showed an apparent improvement of the financial condition, but this was an illusion. The foregoing table shows the excess of expenditures over receipts in some of the years following the revolutionary movements of 1848. Since the reorganization of the empire in 1867, there are separate budgets for the common affairs of the whole empire and for each of the two large divisions. In the budget for 1872 the amount needed for the common affairs of the empire is estimated at 110,647,498 florins, of which 95,165,007 were to be devoted to the army and 11,254,690 to the navy. From the receipts of the ministry of war, the excess of duties, and the incomes of the consulates, 17,208,883 were to be obtained; of the balance, 93,438,615, the Cisleithan provinces were to furnish 65,145,402, and the Transleithan provinces 28,293,213. The budget of the countries represented in the Reichsrath for 1871 fixes the revenue at 338,084,609, the largest items being 80,200,000 from direct taxes, 187,073,546 from indirect taxes, 33,461,058 from the state domain and from state institutions. The expenses were to amount to 349,811,642 fl. (99,984,711 fl. interest on the public debt). Thus there would again be a deficit of 11,727,033. The consolidated debt of Austria on Dec. 31, 1870, amounted to 2,572,733,402 fl.; the entire debt to 2,593,269,591, being an increase over 1869 of 3,000,000 fl. The aggregate debt of the provinces amounted in June, 1870, to 243,979,690 fl.—The army of the entire monarchy was reorganized in 1868. According to the new regulations the liability to military service is universal, begins with the completion of the 20th year, and must be rendered personally. The army is divided into the standing army, the navy, the landwehr, the reserve, and the landsturm. In the Cisleithan provinces military duty lasts 10 years (3 years in the line, 7 in the reserve). In the landwehr those who have been in the line and in the reserve have to remain 2, all others 12 years. The standing army and the navy are placed under the imperial minister of war for the common affairs of the empire; the landwehr and the landsturm (which is to comprise all men capable of doing military duty until the 50th year of age, but was not yet generally organized in 1871) are in each division of the empire placed under the minister for the defence of the country. The standing army numbered in August, 1871, 254,041 men on the peace footing; in time of war the army, including the reserve, would number 820,811 men; while the landwehr numbered in addition 219,471 men. The subdivisions are: 1. Infantry: 80 regiments of the line, 14 regiments of frontier men, 1 regiment of Tyrol riflemen, 33 battalions of riflemen. 2. Cavalry: 14 regiments of dragoons, 13 regiments of uhlans, 14 regiments of hussars. 3. Artillery: 12 regiments of field artillery, 12 battalions of fortress artillery. 4. Two regiments of engineers and one regiment of pioneers. 5. Five corps for military transportation. Among the fortresses of Austria, Comorn, Olmütz, Peterwardein, and Temesvár are the strongest. The best naval ports are Pola, Trieste, and Cattaro. The Austrian navy in 1871 consisted of 47 steamers, among which were 11 ironclads, 20 sailing vessels, and 6 tenders; in all 72 vessels, carrying 522 guns. The corps of naval officers embraces 2 vice admirals, 5 rear admirals, 16 captains of ships of the line, 17 captains of frigates, and 18 captains of corvettes.—The present archduchy of Austria, anciently inhabited by the Celtic tribe of the Taurisci, afterward called Norici, was conquered by the Romans in 14 B. C. During the first centuries of the Christian era that portion of Austria north of the Danube belonged to the possessions of the Marcomanni and Quadi; part of Lower Austria and Styria, including the municipium of Vindobona (Vienna), to Pannonia; the rest of Lower Austria and Styria, with Carinthia and part of Carniola, to Noricum; Tyrol to Rhætia. After the middle of the 6th century the river Enns constituted the boundary between the Teutonic nation of the Boioarii (Bavarians) and the Turanian Avars. Charlemagne annexed the country of the Avars to the German empire in 791. It was then called Avaria or Marchia Orientalis (eastern territory), and subsequently Austria, constituting since 843 the easternmost district of Germany. Having been conquered by the Magyars in 900, it was ultimately reannexed to Germany by Otho I. in 955. In 983 Leopold of Babenberg was appointed margrave of Austria. His dynasty remained in possession for 263 years, adding largely to its territory by the annexation of Styria and Carniola, by conquests from the Slavic tribes, and by inheritance. Under the reign of Henry Jasomirgott Austria was erected into a hereditary duchy in 1156. On the death of Frederick II., the last of the Babenberg dynasty (1246), the German emperor Frederick II. claimed Austria as a vacant fief of the imperial crown. But neither he nor his son Conrad IV. succeeded in establishing his authority, and in 1251 the Austrian states elected Ottocar, second son of the Bohemian king Wenceslas, duke of Austria and Styria. Having refused to acknowledge Rudolph of Hapsburg as German emperor, Ottocar was defeated by him in 1276, and compelled to surrender to the victor all his possessions except those belonging to the Bohemian crown. From that time up to the present day the house of Hapsburg, whose original possessions were in Switzerland, has ruled in Austria. Rudolph's son and successor Albert obtained in 1301 the Swabian margraviate. At his death in 1308 Austria had already an area of 26,000 sq. m. Of his five sons, Leopold was defeated at Morgarten in 1315, while attempting to resubdue the revolted Swiss cantons, and Frederick III., surnamed the Handsome, was vanquished by Louis the Bavarian in his

fight for the imperial crown in 1322. The possessions of their house, which were divided by them, were finally united in the hands of the fourth brother, Albert II. But another division took place among the heirs of the latter, when Albert III. got Austria proper, and Leopold all the rest. Leopold was slain in battle against the Swiss at Sempach in 1386, but his descendants remained in possession of Styria, and inherited the duchy of Austria in 1457, when Albert's line became extinct. Frederick IV. of Austria, having been elected German emperor, elevated Austria to the rank of an archduchy. His son Maximilian I., who succeeded him in 1493, obtained the Netherlands by marrying Mary, the heiress of Charles the Bold of Burgundy, and Tyrol by inheritance; and by marrying his son Philip to the daughter of Ferdinand and Isabella he brought the Hapsburg family upon the throne of Spain. Philip's son, Charles I. of Spain, became, under the name of Charles V., German emperor in 1519. In 1520 and 1521 the latter ceded the Austrian possessions to his brother Ferdinand I., who subsequently also succeeded him in the empire. Ferdinand obtained the kingdoms of Hungary and Bohemia as successor, by family treaties as well as elections, to his brother-in-law, King Louis II., who fell in the disastrous battle of Mohács against the Turks (1526). Thus elevated to the rank of one of the great European powers, the house of Austria possessed an area of 114,000 sq. m. But the possession of Hungary was not undisputed. John Zápolya, waywode of Transylvania, aided by the Turks, tried to wrest the crown of St. Stephen from Ferdinand; and in 1529 Sultan Solyman had already invested Vienna, when the prudent generalship of Count Salm compelled him to retire. By a treaty concluded in 1538, Zápolya got eastern Hungary and the title of king, while the possession of Transylvania was guaranteed to his descendants. Even after Zápolya's death (1540) Ferdinand could reënter into possession of lower Hungary only by paying an annual tribute of 30,000 ducats to the Turks. The war with the latter had soon to be renewed, however, and Hungary remained a battlefield for more than a century. (See Hungary.) In 1564 Austria was once more divided among Ferdinand's sons, Maximilian II. (German emperor 1564–'76) obtaining Lower Austria, Hungary, and Bohemia; Ferdinand, Tyrol and Upper Austria; Charles, Styria, Carinthia, Carniola, and Görz. The final reunion took place about 100 years later. Rudolph II., successor to his father Maximilian (1576–1612), one of the feeblest and worst emperors Germany ever had, was compelled to cede Bohemia, Hungary, and Austria to his brother Matthias, under whose reign (1612–'19) the 30 years' war originated, by the revolt of the Bohemian Protestants against the Hapsburg dynasty. Ferdinand II. of Styria, cousin of Matthias (emperor 1619–'37), having defeated the rival king elected by the Bohemians, Frederick of the Palatinate (1620), led a war of extermination against the Protestants of Bohemia and Moravia, expelled them by thousands from his dominions, and annulled all ancient privileges of the states. In the course of the war, Ferdinand, shortly after the assassination of Wallenstein, was compelled to cede Lusatia to Saxony (1635). Ferdinand III. (1637–'57) brought the war to an end by the peace of Westphalia (1648). His son, Leopold I. (1657–1705), by his misrule drove the Hungarians into alliance with the Turks. In 1683 Kara Mustapha besieged Vienna, which was saved only by the timely arrival of a Polish army, led by John Sobieski. Leopold's armies having reconquered Hungary, it was converted from an elective kingdom into an hereditary one (1687). Transylvania, too, was occupied. In 1699 Turkey, defeated in many sanguinary battles by Prince Eugene, ceded, by the peace of Carlovitz, the country between the Danube and Theiss rivers to Austria. Leopold's design to obtain the succession in Spain for his second son, Charles, was frustrated by the diplomacy of Louis XIV. of France. This occasioned, on the death of Charles II. of Spain (1700), the war of the Spanish succession, in which England, the Netherlands, Portugal, and Savoy took sides with the emperor against France, while Louis XIV. was aided by a powerful insurrection in Hungary, under Rákóczy. The victories of Eugene and Marlborough rendered success certain when, by the death of Leopold and of his eldest son Joseph I. (1711), his brother Charles became monarch of Austria. The allies, fearing the preponderance of Austria if the crowns of Spain, Naples, and Germany should be united again, desisted from their efforts against France, and a peace was concluded at Utrecht in 1713, by which the Spanish Netherlands, Milan, Naples, and Sardinia (exchanged for Sicily in 1720) fell to Austria, while Philip of Anjou, grandson of Louis XIV., was acknowledged as king of Spain. By this treaty the area of Austria was increased to 191,000 sq. m. The treaty of Passarowitz (1718) secured new advantages on the Turkish border. Having once more waged war with France and Spain, Charles VI. lost Naples, Sicily, and a portion of Milan (1735); while the peace of Belgrade (1739) deprived him of nearly all the fruits of Prince Eugene's victories over the Turks. All these sacrifices Charles consented to, principally from a desire to obtain the general recognition of the so-called "pragmatic sanction," by which his daughter, Maria Theresa, was declared the heiress of the Austrian monarchy. Yet, immediately after his death (1740), her right of succession was contested by the leading powers, England excepted. Frederick II. of Prussia seized Silesia, which formed a part of the Bohemian dominions of Austria, and the elector of Bavaria assumed the title of archduke of Austria, and was elected German emperor, under the name of Charles VII. (1742). Noth-

ing but the fidelity of the Hungarians saved Maria Theresa. By the treaties of Breslau and Dresden (1742 and 1745), she resigned her claims to Silesia; by that of Aix-la-Chapelle (1748), to Parma, Piacenza, Guastalla, and part of Milan. In the mean time the emperor Charles VII. had died (1745), and Maria Theresa's husband, Francis Stephen, grand duke of Tuscany, belonging to the ducal family of Lorraine, had been elected German emperor, as Francis I. In order to get Silesia back from Prussia, Maria Theresa conspired with France, Russia, Saxony, and Sweden against Frederick; but the seven years' war, in which Frederick covered himself with glory, resulted only in the reaffirmation of the *status quo*. Francis, who died in 1765, was succeeded as emperor by his son Joseph II., who in Austria acted only as assistant regent until the death of his mother (1780). During this period eastern Galicia and Lodomeria were taken forcibly from Poland (1772), the Bukowina was obtained from Turkey (1777), and some smaller possessions were acquired in Germany by the peace of Teschen (1779), increasing the Austrian dominions altogether to an area of 233,741 sq. m. Joseph II., reversing the traditional policy of his predecessors, granted religious liberty to Protestants, discontinued the censorship of the press, reorganized public education, abolished 900 convents, and developed industry by a protective tariff; but his arbitrary measures exasperated the Hungarians, and drove the Austrian Netherlands into rebellion. The latter he tried to exchange for Bavaria, a project which was frustrated by the efforts of Frederick of Prussia. No less unfortunate in his war against Turkey, Joseph died from grief (or, as some believed, from poison) in 1790. His brother, Leopold II. (1790–'92), reconciled Hungary and the Netherlands, made peace with Turkey, and entered into the coalition against revolutionary France, but was unable to rescue his sister, Marie Antoinette. Thus his son Francis (1792–1835) was, immediately on his accession to the throne, drawn into the whirlpool of the revolutionary wars. By the peace of Campo Formio (1797) he lost Lombardy and the Netherlands, but obtained in exchange a large portion of Venetia. Two years before he had obtained western Galicia by the third partition of Poland. In 1799 Austria, allied with Russia, declared war against the French republic for the second time, but was compelled by Bonaparte to accept the peace of Lunéville (1801), by which his brother, the archduke Ferdinand, was deprived of Tuscany, being compensated by Salzburg, Passau, Eichstadt, and the title of prince-elector. The public debt of Austria had now increased to 1,200,000,000 florins. On Aug. 11, 1804, Francis proclaimed himself hereditary emperor of Austria (as such Francis I.), uniting all his dominions under the name of the Austrian empire. In the next year, having again gone to war with France, he was forced by the defeat at Austerlitz to sign a most ignominious peace at Presburg (Dec. 26, 1805). When, by the organization of the Rhenish confederation (Rhinebund), under the auspices of Napoleon (1806), the integrity of the German empire had been destroyed, Francis laid down the imperial crown of Germany (Aug. 6, 1806). A fourth time he determined upon a war against Napoleon, aided only by England (1809), but the result was most disastrous. The peace of Vienna (Oct. 14, 1809) took away from Austria about 42,000 sq. m. of territory, with 3,500,000 inhabitants. Utterly prostrated and driven into bankruptcy, Francis did not dare to withhold his consent when Napoleon proposed to marry his daughter Maria Louisa (1810), and in 1812 he even entered into alliance with Napoleon against Russia. But when the Russian campaign had broken Napoleon's power, and Prussia had risen against him, Austria joined in the alliance of England, Russia, Prussia, and Sweden (1813), and took a conspicuous part in the overthrow of the French empire. By the peace of Paris (1814) the Lombard and Venetian territories, now united into a kingdom, and all former possessions returned to Austria. In 1815 Francis, with Alexander of Russia and Frederick William III. of Prussia, formed the "holy alliance," for the restoration of the old monarchical system, Vienna having in the preceding year become the seat of the congress convoked for the purpose of reconstructing Europe. The suppression of liberal ideas and movements throughout Europe appeared to be thenceforth the principal object of the Austrian government, of which Prince Metternich was the soul. Austria quelled the popular insurrections in Naples and Piedmont (1820 and 1821), aided by its diplomacy in the suppression of the popular movement in Spain (1823), favored Turkey in its struggle with the Greeks, and crushed the insurrections which in Italy followed close upon the French revolution of 1830. In the interior new attempts were made, though without success, to subvert the constitution of Hungary. The death of Francis, who was succeeded by his son Ferdinand (1835), made no change in the Austrian administration. At an interview of Ferdinand with the monarchs of Russia and Prussia the holy alliance was reaffirmed. In the oriental imbroglio of 1840, Austria sided with England and Russia. Unrelenting rigor was exercised in Italy. The Polish insurrection in Cracow (which in consequence was annexed to Austria) was accompanied by an attempt at rising in the adjoining parts of Galicia (February, 1846); but the government succeeded in quelling the movement by instigating the wrath of the peasants against the noblemen, many of whom were massacred. In the Italian provinces the opposition was fostered by the political reforms of Pope Pius IX., and the concessions to popular opinion wrung from the other Italian governments. In Hungary the former parliamentary opposition of the diet had gradually grown into national enmity, es-

pecially so since the death of the palatine, Archduke Joseph (1847); similar movements appeared in Bohemia, while even in Austria proper the states insisted upon some participation at least in the administration of the government. From all these elements a storm arose in 1848 which brought the entire Austrian monarchy very near its ruin. On March 13, shortly after the revolution in Paris which drove Louis Philippe from his throne, the people of Vienna rose against the ministry, which made but a feeble show of resistance; Metternich was compelled to resign, and the emperor pledged himself to convoke an assembly of representatives of the people, to form a constitution for the empire. But at the same time the Hungarian diet, led by Kossuth, demanded and obtained an independent constitutional government, leaving merely a dynastic union with Austria. Outbreaks in Italy followed closely; Radetzky was driven from Milan, and Pálffy surrendered Venice to the people. While thus momentarily successful in the provinces, the revolution created the direst confusion in the centre of the empire. Of the revolutionists, some were in favor of uniting those provinces in which the German nationality predominates to Germany, leaving Hungary to herself, and favoring the union of the Italian states under a national government; while others were unwilling to hazard the position of Austria as one of the great powers, against the vague hope of a reconstruction of Germany. In Vienna the ministry of Count Fiquelmont, which had succeeded Metternich, proved its incapacity to grapple with the pending difficulties, and the political power fell into the hands of a central committee of the national guard and the students' legion. The emperor, unwilling to resort to extreme measures, fled to Innspruck (May 17). Another unsuccessful attempt of the ministry to break the power of the students led to the organization of a committee of public welfare (May 25), which, until the meeting of an Austrian parliament (July 22), exercised an almost unlimited control, compelling the ministry to make room for successors more subservient to the masses (July 8). When utterly prostrated in the capital, the imperial power began to gather strength in the provinces. A popular outbreak at Prague was suppressed, after a bombardment of the city (June 15–16), by Prince Windischgrätz. In Lombardy, Radetzky, who had retired to Verona, opened an aggressive campaign in June, captured Vicenza, Padua, and other important places, and routed the Sardinian army (the king of Sardinia, Charles Albert, having taken sides with the revolted provinces) near Custozza, July 25. The national Hungarian ministry of Bathyányi and Kossuth, preparing the way for an independent Magyar kingdom, awakened the fears and national antipathies of the Slavic races which would necessarily have formed part of this kingdom. Jellachich, the governor (*ban*) of Croatia, strengthened by the connivance of the imperial court, pronounced against the Hungarian government. Count Lamberg, the imperial commissioner despatched to Pesth, was there killed by the people (Sept. 28). Immediately the emperor ordered the dissolution of the Hungarian diet, and appointed Jellachich supreme military commander of Hungary. The diet, denying the authority of the emperor, organized a committee of safety, with Kossuth at its head. When the garrison of Vienna (Oct. 6) was departing for Hungary, the people of the capital, sympathizing with the Hungarians, rose once more. They took the arsenal, and hung the secretary of war, Count Latour, at the window of his office. The parliament declared itself permanent, and sent an address to the emperor asking for a new ministry and the removal of Jellachich. The emperor, who in June had returned from Innspruck to Vienna, again fled to Olmütz. The masses of the capital armed themselves under the leadership of the Polish general Bem, preparing to resist the impending attack of the army. The garrison, joined outside the city by the remnants of the army of Jellachich, which had been beaten near Buda, and by the army corps of Prince Windischgrätz, assaulted Vienna, Oct. 23; but the people made a desperate resistance until the 31st, when, the Hungarians having the day before been defeated almost before its gates, the city was taken by storm with immense slaughter. Many of the popular leaders were shot, among others Robert Blum, member of the parliament of Frankfort, Messenhauser, commander of the national guard, and Jellinek, editor of the "Radical." On Nov. 22 a new ministry was formed, of which Prince Felix Schwarzenberg was president. The emperor Ferdinand was induced to resign, Dec. 2, 1848, in favor of his nephew, Francis Joseph, a youth of 18 years, whose mother, the archduchess Sophia, had been the leading spirit of the counter-revolutionary movement. The campaign against Hungary was commenced at once, but carried to a successful termination only by the powerful intervention of Czar Nicholas, the Hungarian main army, under Görgey, surrendering (Aug. 13, 1849) to the Russians at Világos. (See HUNGARY.) Hungary, which had declared its independence, was treated as a conquered country. Many military and parliamentary leaders were shot or hung, and the prisons crammed with the unhappy victims of imperial revenge. Simultaneously with these occurrences the war in Italy had been terminated. Within a few days Gen. Radetzky routed the Sardinian army twice, at Mortara (March 21, 1849) and Novara (March 23), and obtained a peace by which Sardinia was obliged to reimburse Austria for the expenses of the war (15,000,000 livres). Venice, where an independent republican government had been organized under the lead of Manin, was invested by Radetzky, and forced to surrender, Aug. 23, 1849.—The revolution having been con-

quered, the Austrian government commenced the arduous task of reorganizing the monarchy upon a firmer basis than before. The parliament, which after the bloody struggle at Vienna had been adjourned to Kremsir in Moravia, was dissolved March 4, 1849, and a constitution promulgated by the free will of the emperor, of which only the reactionary parts went into operation. The efforts of the national parliament at Frankfort to reconstruct the German empire, excluding Austria from it, were violently opposed by the Austrian government, and Frederick William IV. of Prussia durst not defy this opposition, backed as it was by that of Russia and France, by accepting the imperial crown offered by the Frankfort assembly. Still, by assuming the leadership of the counter-revolutionary movements in Germany, and aiding the petty princes to put down the people, Prussia obtained a preponderating influence in northern Germany, and made some efforts to centralize the confederacy, all of which were prostrated by the energetic policy of Prince Schwarzenberg. In 1850 the diplomatic conflict between Austria and Prussia seemed to point to a crisis; armies were put in motion, and a fight among some outposts had already taken place near Bronzell in Hesse-Cassel (Nov. 8, 1850), when at the last moment Prussia, in a ministerial meeting at Olmütz (Nov. 29), submitted to the demands of Austria, and the German diet at Frankfort was reëstablished the same as it was before 1848; Austria, on her part, renouncing for the time being the idea of entering into the Germanic confederation with all her possessions. The energy displayed in the management of foreign relations was manifested by the Austrian minister of the interior, Bach, in the administration of the internal affairs of the empire. All remnants of the revolutionary period were annihilated, with one exception only, the abolition of socage. The constitution of 1849 was annulled Jan. 1, 1852; trial by jury was abolished; the public press crushed down with the utmost severity; and the influence of the clergy reëstablished. Extraordinary efforts were made to develop the resources of the monarchy by encouraging agriculture, industry, and commerce. A new tariff was adopted, and negotiations were commenced with other German states for the establishment of a complete customs union with the Zollverein. Prussia, fearing lest her influence might be outweighed by that of Austria, opposed this movement; but several of the Zollverein states took sides against her, and the moment seemed to be near at hand when her objections would have been overborne, when Schwarzenberg's sudden death (April 5, 1852) brought on a change in the policy of Austria. His successor, Count Buol-Schauenstein, declined to press the propositions made by Schwarzenberg, and contented himself with the conclusion of a commercial treaty between Austria and the Zollverein (1853). The reconciliation with Prussia was completed at a personal interview of the emperor and Frederick William IV. On Feb. 6, 1853, another popular outbreak occurred at Milan, but was suppressed without difficulty. A diplomatic rupture with Switzerland, where the Italian revolutionists had taken refuge, was the consequence. On Feb. 18 an attempt was made against the emperor's life by a young Hungarian, Libényi. These events were important only so far as they tended to perpetuate the severe military rule. When, toward the end of 1852, the Montenegrins rose against the Turks, Austria sided with them, and Count Leiningen, who was sent to Constantinople (February, 1853), obtained full redress of their grievances.—At the time of the complications which led to the Crimean war, Austria proclaimed her neutrality, and on April 20, 1854, a treaty was concluded by Austria and Prussia, both pledging themselves to take an active part in the war only whenever the interests of Germany should appear to be endangered. The czar, indignant at what seemed to him base ingratitude on the part of Austria, endeavored by flattery to incite the smaller German states against her, and went even so far as to threaten an appeal to the Slavic races. Thus Austria was forced to change her neutrality pure and simple into an armed one. She agreed with Turkey to occupy the Danubian principalities, advanced an army of 300,000 men toward the Polish frontier, and proposed to Russia the four points which afterward became the basis of peace. This proposition having been rejected, Austria assumed an attitude so threatening that the Russians were obliged to retire from Turkish territory. An Austrian army under Gen. Coronini entered Wallachia, and the war on the Danube was virtually at an end. By promising to the western powers an active support whenever they would pledge themselves to carry on the war in such a manner as effectually to cripple the Russian power, Austria induced them to determine upon the Crimean expedition. Now, at last, the active coöperation of Austria seemed to be certain; indeed, a treaty to that effect was agreed to by her Dec. 2, 1854; but in consequence of the tardy success of the allied armies before Sebastopol and the unwillingness of the other German powers to accede to the treaty, she again fell back upon her former vague promises, merely offering her good offices to the contending parties. Not even when the Russians once more invaded Turkish territory did she move against them. Plenipotentiaries of the belligerent powers met at Vienna in March, 1855, but were unable to agree upon a basis of peace, and finally adjourned. During the progress of the negotiations Austria had distinctly pledged herself to go to war if Russia should remain obstinate, when all at once she began to reduce her army on the frontier. Financial embarrassments and the cholera, which within a few months destroyed 25,000 soldiers, were the ostensible cause for this unexpected move-

ment, the real cause being probably the assurance given by Russia that in any case she would adhere to those of the four points which involved the special interests of Austria. The emperor of the French, who formerly had been anxious to secure the friendship of Austria on any terms, began to look toward Russia, and eagerly seized the first opportunity of concluding peace (1856). During the war the work of centralization had been carried on by the Austrian government with apparent success. By the concordat with the holy see (1855) Austria gave back to the Roman Catholic clergy all the privileges and influence which had been wrested from them since the time of Joseph II. By stimulating public enterprise and promoting the material interests of all classes of the population, the government was earnestly endeavoring to make the people forget the events of 1848 and 1849. The military rule was somewhat relaxed, and a general amnesty was proclaimed for political offences.—The progress of internal reforms was soon again interrupted by foreign complications. At the beginning of 1859 the Austrian statesmen learned from some ominous words addressed on new year's day by the French emperor to Baron Hübner that Cavour had succeeded in gaining over Louis Napoleon to the designs of Victor Emanuel, and that they must be prepared for a war not only against Sardinia but against France. In this new complication the sympathies of Prussia and the other German states were strongly enlisted in favor of Austria, and even England and Russia showed a readiness to shield her from the impending danger. The diplomatic efforts of the neutral powers were, however, thwarted by an ultimatum which Austria hastened to address to Sardinia. This ultimatum not being accepted, Austria declared war, and appointed one of her most incompetent generals, Count Gyulay, commander-in-chief. The hope of the Austrians that they could overpower the Sardinian army before the French could come to its aid was not fulfilled. The Sardinian territory, which Count Gyulay had invaded on April 29, had soon to be evacuated. The victory of the united French and Sardinian armies at Magenta, June 4, compelled the Austrians to abandon also Lombardy and to retire upon their famous quadrilateral, Mantua, Verona, Peschiera, and Legnago. After a second defeat at Solferino, June 24, the Austrians deemed it best to make peace with Louis Napoleon. An offer of Prussia to take up arms as an ally of Austria, in defence of the treaties of 1815, was regarded as unacceptable because Prussia insisted on having in this case the chief command of all the non-Austrian German contingents. Austria consented in the preliminary peace of Villafranca (July 11), and in the definitive peace of Zürich (Nov. 10), to the cession of Lombardy. Napoleon, to whom the cession was made, transferred it in the peace of Zürich to Sardinia. The promises made by Sardinia that the dethroned dynasties of Tuscany, Modena, and Parma should be restored, and that the Italian states should form a confederation into which Austria should be admitted on account of Venetia, were never fulfilled.—The disastrous issue of the war was followed by new convulsions in the interior. Public opinion seemed generally to be agreed that the empire was in an untenable condition, and that sweeping reforms were needed. The ministers of foreign affairs and of the interior, Count Buol-Schauenstein and Bach, who were regarded as the chief representatives of the ruling policy, had to resign, but no other changes of importance were made. The financial troubles again made themselves felt, and a new loan of 200,000,000 fl., which was to be raised by a national subscription, proved a complete failure. A first attempt to reorganize the administration of the empire was made by the imperial patent of March 5, 1860, which gave to the Reichsrath a limited right of coöperation in the legislation and in the control of the finances. When the Reichsrath, the number of whose members had been increased, met in June, its majority agreed with the new minister of the interior, Count Goluchowski, in advising the abandonment of the centralizing and the adoption of a federalistic policy. The emperor fulfilled this wish by the publication of the imperial diploma of Oct. 20, 1860 (the *October-Diplom*), which conferred upon the diets of the several crown lands the right of legislation on all affairs save those expressly reserved for the Reichsrath. The latter class embraced only the finances of the empire, and the foreign, war, and commercial affairs. The Reichsrath was in future to consist of 100 members elected by the provincial diets, and of the members appointed by the emperor. The novel constitution which Austria was to receive by this diploma failed to be acceptable to any party. To the Poles of Galicia and the Czechs of Bohemia, who demanded complete autonomy, it did not go far enough in the direction of federalism. Hungary insisted on the unconditional restoration of its constitution. The German liberals demanded, on the one hand, a more popular composition of the Reichsrath, and on the other, a greater centralization, as the excessive rights conferred upon the crown lands must in the natural course of development lead to a dissolution of the empire. Their arguments made an impression upon the court; Count Goluchowski was dismissed in December, 1860, and succeeded by Schmerling, who in 1848, as minister of the German empire during the regency of the archduke John, had acquired the reputation of an able and liberal statesman. The imperial patent of Feb. 26, 1861 (the *Februar-Patent*), which soon followed the appointment of Schmerling, resumed the work of welding all the discordant provinces of the polyglot empire into a strongly consolidated, truly constitutional monarchy. The Reichsrath, which received all the usual rights of parliaments, was to consist of a *Herrenhaus* or house

of lords, and a house of deputies numbering 343 members. Affairs common to the non-Hungarian provinces were to be acted upon by the non-Hungarian members as "limited Reichsrath" (*Engerer Reichsrath*). The first session of the new Reichsrath (May, 1861) was attended by deputies from all the German and most of the Slavic provinces; but Hungary, Croatia, Transylvania, and Venetia were not represented. All the efforts of the government to induce these crown lands to send deputies proved fruitless. In Hungary, in particular, all parties united for a "passive resistance." The Saxons and Roumans of Transylvania were prevailed upon in 1863 to take part in the Reichsrath; but soon the Czechs of Bohemia and Moravia refused a further attendance. The proceedings of the Reichsrath did not make a favorable impression upon the public mind, and the annual deficits continued to swell the public debt to a fearful amount. Schmerling finally saw the impossibility of carrying through his plans, and resigned in June, 1865. The prominent feature of the foreign policy of Austria during the administration of Schmerling was the struggle for her continued ascendancy in the German confederation, which appeared to be threatened by the growing power of Prussia. Schmerling endeavored to secure the admission of all the dominions of Austria into the German confederation and the German Zollverein, but in vain. In order to gain the sympathy of the liberals throughout Germany, who it was thought had been alienated from Prussia by the policy of Bismarck, the Austrian government proposed a liberal reformation of the federal diet. An invitation from the emperor Francis Joseph to the German princes and the burgomasters of the free cities to assemble in Frankfort on Aug. 17, 1863, for the discussion of this question, was accepted by all those invited except the king of Prussia, whose opposition proved sufficient to foil the plan. Notwithstanding these repeated humiliations by Prussian diplomacy, the Austrian minister of foreign affairs, Count Rechberg, soon after accepted a proposition from Prussia that the Schleswig-Holstein difficulty be regulated by the two great German powers, and not, as the national party in Germany desired, by the federal diet. Austria accordingly took part in the Schleswig-Holstein war, finally terminated on Oct. 30, 1864, by the peace of Vienna, in which Christian IX. of Denmark ceded the duchies of Schleswig, Holstein, and Lauenburg to the emperor of Austria and the king of Prussia. Soon, however, the Austrian court became suspicious of the Prussian alliance, which not only alienated the middle states from Austria, but threatened her with new diplomatic humiliations. A falling out of the two powers, and even the outbreak of hostilities, was seriously feared; but it was for a time averted by the Gastein convention of Aug. 14, 1865, according to which Lauenburg was incorporated with Prussia, Holstein occupied by Austrian and Schleswig by Prussian troops. Meanwhile the liberal Schmerling cabinet had been succeeded by one consisting of a combination of feudal federalists and old conservative Hungarians, with Count Belcredi, a Czech, as president. One of the first acts of the new ministry was the suspension of the constitution of February, 1861, under the pretext that a new attempt was to be made to come to a full understanding with Hungary. When the diets of the German and Slavic provinces were convoked in November, those of Galicia and Bukowina, as well as the Czech majority of the Bohemian diet, voted addresses of thanks to the emperor; while all the German diets, with the single exception of that of Tyrol, which was under the control of the "Catholic" party, demanded the recognition of the continued legal existence of the constitution of February. The Slavs generally rallied for the support of the new ministry, and the conflict between the Slavic and German nationalities assumed dimensions previously unknown. The negotiations with Hungary did not have the desired effect. Although the emperor on Dec. 14, 1865, opened himself the Hungarian diet, and although the Hungarians received him and the empress, who soon came likewise to Pesth, with unbounded enthusiasm, the majority of the diet insisted on greater demands than the emperor thought it compatible with the interests of the dynasty to concede. Before an understanding had been arrived at, the complications with Prussia reached a crisis. The governments of both Austria and Prussia were fully aware of the grave dangers connected with the solution of the Schleswig-Holstein question. Prussia meant to take the duchies herself; Austria supported the duke of Augustenburg. Early in 1866 both began to arm and to prepare for war. Austria endeavored to recover the sympathy of the middle states of Germany; Prussia, on April 8, concluded a defensive and offensive alliance with Italy. A motion of Austria in the federal diet of Germany (June 1, 1866) to have the claim of the prince of Augustenburg to Schleswig-Holstein decided by the federal diet, was declared by Prussia to be a violation of the Gastein convention. Prussian troops were immediately marched into the duchy of Holstein, which the Austrian commander, Gen. von Gablenz, yielding to superior numbers, hastened to evacuate. The majority of the federal diet, regarding these steps as disloyal demonstrations against the authority of the confederation, ordered (June 14), on motion of Austria, the mobilization of the entire army of the confederation with the exception of the Prussian corps. Prussia declared that this decree was a radical subversion of the fundamental principle of the confederation, and that she now considered the original pact as broken. Regarding the resolution as a declaration of war on the part of all the states which had voted for it, Prussia at once began its military operations. Feldzeugmeister

Benedek was appointed commander-in-chief of the northern and Archduke Albrecht of the southern armies of Austria. The Prussians advanced with a rapidity for which Austria and her allies were not prepared, and the troops of the smaller states proved as of old entirely inefficient. The Prussian progress through Saxony was undisputed, and the first serious encounter took place on Austrian soil. The military superiority of the Prussians soon became apparent; one Austrian corps after another was beaten, until on July 3 the bulk of their army suffered a crushing defeat at Sadowa near Königgrätz in Bohemia. This victory of Prussia filled the army of Austria, as well as the government and the population, with consternation. No halt was made in the retreat, and all the provinces north of Vienna were abandoned to the enemy. The government relieved Benedek of the chief command, which was transferred to the archduke Albrecht, who in the meanwhile had been entirely successful in the campaign in Venetia, having defeated the Italian army at Custozza (June 24) and driven it back across the Mincio. With him a part of his army was called to the northern seat of war. Hoping to detach Italy from the alliance with Prussia, the Austrian government had, moreover, on the day after the battle of Sadowa, ceded Venetia to Louis Napoleon, and requested his friendly mediation for bringing about peace. Italy declined to follow the advice of Napoleon, and, while the Prussians marched upon Vienna, again invaded Venetia and some districts of Tyrol. A naval victory of the Austrian admiral Tegetthoff at the island of Lissa (July 20) did not change the general prospects of the war, and had no influence upon the progress of the peace negotiations, which through the mediation of France had began at Nikolsburg. *A preliminary peace was concluded on July 26, which on Aug. 23 was followed by the definitive peace of Prague. Austria consented to the establishment of the North German confederation under the leadership of Prussia, and to the incorporation of Hanover, Hesse-Cassel, Nassau, Frankfort, and Schleswig-Holstein with the Prussian dominions. Between Austria and Italy a truce was concluded on Aug. 12, and a definitive peace on Oct. 3 at Vienna. Austria recognized the union of Venetia, which Napoleon had ceded to Victor Emanuel, as well as of Lombardy with the kingdom of Italy, while the Italian government agreed to assume the debt of Lombardy and Venetia, and 35,000,000 florins of the general Austrian debt, and also promised to restore to the dethroned princes of Tuscany and Modena, who were relatives of Francis Joseph, their private movable and immovable property.—Count Mensdorff, the minister of foreign affairs, and Count Maurice Esterházy, who was believed to be the chief adviser of the emperor, resigned their places in the ministry on Oct. 30. Mensdorff was succeeded by Baron Beust, who, as the representative of Saxony in the federal diet, had gained the reputation of being the ablest opponent of the Prussian policy among the statesmen of the middle states. Beust soon submitted a novel plan for the reconstruction of Austria. He was as much opposed to the centralism of Schmerling as to the feudal federalism of Belcredi, and in the place of both recommended a strictly dualistic basis as the best remedy for the evils which had brought Austria to the brink of an unfathomable abyss. As the hope of Belcredi and his old conservative Hungarian friends to effect a reconciliation with Hungary was disappointed, Beust found a favorable hearing for his ideas. The main point of his programme was a lasting reconciliation with Hungary, and to that end the adoption of the propositions which Deák, the recognized leader of the majority of the Hungarian diet, had made to Belcredi. Beust advised the emperor to appoint at once a Hungarian ministry, and to obtain through it the consent of the Hungarian diet to the draft of the agreement between Cisleithan and Transleithan Austria, as proposed by Deák; to call then, in accordance with the constitution of February, 1861, a meeting of the "limited Reichsrath" of Cisleithania, lay before it the agreement with Hungary as an accomplished fact, and to propose to it such changes in the constitution of February as the concession made to Hungary would require. The advice was accepted; Belcredi resigned, and on Feb. 7, 1867, Beust was appointed prime minister. Within one month the most important points had been settled. Hungary abandoned the idea of a purely "personal union," and agreed to have the army and the foreign affairs in common with Cisleithania; it also promised a revision of the laws of 1848. On the other hand, the subordination of Croatia to the Hungarian ministry and the reincorporation of Transylvania with Hungary were readily conceded. The Hungarians were notified of the accomplished agreement and of the appointment of a responsible Hungarian ministry, of which Count Julius Andrássy was the president, by rescripts dated Feb. 17, 1867, and signed by Francis Joseph as "king of Hungary." On the next day, Feb. 18, the provincial diets of all the German and Slavic crown lands were opened. The German diets generally declared themselves satisfied with the settlement of the Hungarian question; most of the Slavic diets showed themselves at least not irreconcilable; but the Czechs of Bohemia so violently opposed the projects of the government that the Bohemian diet had to be dissolved. The Czech leaders were so incensed at the new turn of Austrian politics that they used the so-called ethnographical exhibition at Moscow (May, 1867) as a welcome occasion for an ostentatious display of Panslavistic tendencies. The Reichsrath of the German and Slavic provinces, which was opened on May 22, 1867, formally approved the agreement concluded with Hungary, but at the

same time declared that the Cisleithan provinces would not be fully satisfied until they should receive the same guarantee of their constitutional rights which had been given to the Hungarians. The majority of the Reichsrath demanded, in particular, a revision of the concordat, which in the opinion of the liberal party gave to the pope and the bishops privileges not compatible with a constitutional monarchy. The numerous manifestations for and against a revision of the concordat produced a profound agitation; but, though Beust unmistakably leaned toward the side of the liberals, he prevented definite action on the subject. On June 8 Francis Joseph was solemnly crowned as constitutional king of Hungary in the ancient capital, Buda. The relations with foreign powers remained peaceful; neither the publication of the secret treaties which Prussia after the peace of Prague had concluded with the south German states, nor the visit of the French emperor (August, 1867) at Salzburg, who desired to bring about an anti-Prussian alliance, could shake Beust's conviction that the preservation of peace was indispensably necessary for completing the work of reorganization at home. The greatest difficulty in the negotiations between the two delegations which had been appointed by the Reichsrath and by the Hungarian diet for regulating the relations between the two great divisions of the empire, was the proportionate distribution among them of the expenditures for the common affairs of the empire and of the public debt. The agreement finally arrived at, according to which 70 per cent. of the expenditures and debt was to be borne by the Cisleithan provinces, and 30 per cent. by Hungary, met with a strong opposition in the Reichsrath, as it was regarded to be too partial to Hungary; but the conviction that a full understanding with Hungary was necessary for the definite reconstruction of Cisleithan Austria upon a constitutional basis outweighed all other considerations, and in December, 1867, all the propositions of the two delegations were agreed to. Both houses of the Reichsrath in the meanwhile (the lower house on Oct. 17, the upper on Dec. 2) had adopted four fundamental laws of the state (*Staatsgrundgesetze*), which in many points modified the constitution of February, 1861, and secured to the Cisleithan provinces a truly constitutional form of government. The laws were sanctioned by the emperor on Dec. 21; and then the reconstitution of the empire on the dualistic basis of a division into Cisleithan and Transleithan provinces was completed. On Dec. 24 the emperor appointed an imperial ministry (*Reichsministerium*) for the common affairs of the empire, consisting of Count Beust as minister of foreign affairs, Herr von Becke as minister of finance, and Gen. von John as minister of war. The first ministry of Cisleithania was announced in the official gazette of Vienna on Jan. 1, 1868. Prince Carlos Auersperg was its president, and among its members it counted some of the prominent leaders of the liberal party in the Reichsrath, such as Dr. Giskra, minister of the interior, Dr. Herbst, minister of justice, and Dr. Brestel, minister of finance. Beust, upon whom the emperor in recognition of his services had conferred the titles of count and chancellor of the empire, remained for nearly four years (December, 1867, to November, 1871) at the helm of the foreign affairs of the empire. During all this time the peaceable relations with other powers were not disturbed, and Beust gained at home and abroad the reputation of being one of the ablest statesmen of Europe. In July, 1870, the peaceable policy of Austria was put to a severe test by the outbreak of the war between France and Germany. The ministry of the empire, whose meetings at this time were also attended by the prime ministers of Cisleithania and Hungary, and presided over by the emperor, declared on July 18 in favor of an attentive neutrality, which, as Beust explained, did not exclude the duty of watching for the safety of the monarchy, and of providing against all possible dangers. The continuance of peace enabled the ministers of Cisleithania and of Hungary to devote their whole attention to internal reforms. One of the first acts of the Cisleithan ministers was to demand from all public officers an oath to support the constitution. The gaps which still existed in the constitution were gradually filled up. A law on the responsibility of the ministry was adopted by a large majority of both houses. The military offices which had been directly dependent upon the emperor were abolished. Thus the archduke Albrecht was relieved from the chief command of the army, and as inspector of the standing army placed under the minister of war. The command of the navy was taken from Archduke Rainer and conferred upon Admiral Tegetthoff. One of the most important reforms was the reorganization of the army on a basis substantially identical with that of the military organization of Prussia. The law, which passed the house of deputies by the large majority of 118 votes against 29 (Nov. 18, 1868), provided in particular for a general liability of all classes of the people to military service, and regulated the appointment to military offices. The financial condition of the empire steadily improved, and although the annual budgets were not yet free from deficits, the productivity and taxability of the country so rapidly advanced as to diffuse everywhere new confidence in the financial future of the empire.—But in spite of so much that looked encouraging, two great conflicts never ceased to darken the horizon of Cisleithan Austria. One of these concerned the regulation of the religious and school affairs. On May 25, 1868, the government sanctioned three laws adopted by both houses of the Reichsrath, which, in accordance with the views of the liberal party, abolished the jurisdiction of the ecclesiastical

courts over the marriage relations of Catholics, transferred the supreme direction and superintendence of the entire department of instruction and education to the state, and regulated the relations of the churches recognized by the state on the basis of equal rights. The papal nuncio in Vienna protested against these laws as a violation of the concordat, and the pope declared them to be null and void; but the government, while endeavoring to conciliate the bishops as much as possible, carried them through. Another important victory was gained by the liberal party in 1870, when the government declared the concordat of 1855 to be no longer valid. Still more important than this religious conflict was that between the different nationalities represented in the Reichsrath. The Czechs of Bohemia and Moravia demanded for the lands of "the crown of St. Wenceslas," by which they understood the provinces of Bohemia, Moravia, and Silesia, an autonomy equal or at least similar to that of Hungary, and including in particular a Czech parliament in the place of Czech deputies to the Vienna Reichsrath. The Silesian diet almost unanimously protested against these schemes; but in Bohemia and Moravia the Czech population gave them an enthusiastic support. As the Germans in 1868 controlled the diets of both Bohemia and Moravia, the Czech members in August resigned their seats, and presented to the presidents of the diets a declaration fully setting forth their views and plans. At the new election for the Bohemian diet all the 81 signers of the declaration, with but one exception, were reëlected. They again refused to attend the diet convoked in September, 1869, as the German members were again in the majority. The Vienna government was willing to enter into negotiations with the Czechs; but the leaders of the latter, Rieger and Sladkowsky, declined to attend the conference which had been proposed by Giskra, and the representatives of the Czech nationality whom Count Potocki in April, 1870, called to Vienna, were equally unwilling to make any concessions. The success of Hungary and the Czech agitation strengthened the hope of the Poles of Galicia that they also might be able to obtain for the Polish parts of the empire an autonomy like that of Hungary, and that thus Galicia might become the nucleus of a restored Polish realm. Accordingly the diet, on Sept. 16, 1868, resolved to petition the emperor to give to the former kingdoms of Galicia and Lodomeria and to the grand duchy of Cracow a separate government, under the direction of a chancellor or special minister, who should be responsible to the diet. When the committee of the Vienna Reichstag declared the Polish demands to be inadmissible, the Polish members of the Reichsrath resigned, and their example was soon followed by the majority of all the Slavic deputies. An insurrection which in October, 1869, broke out in the Slavic province of Dalmatia, in the district of Cattaro, had no connection with the nationality movements. The people of this district, which is separated from the remainder of Dalmatia by a high mountain ridge, and who number only 30,000 souls, had formerly been exempt from military service, and therefore made a forcible resistance to an attempt to enroll them, in accordance with the new military law, in the landwehr. After several bloody encounters, in which the imperial troops suffered severe losses, the insurgents submitted in January, 1870, when several concessions were made to them. In view of the alarming dimensions which the nationality conflicts assumed, the members of the Cisleithan ministry were themselves divided in their opinion as to the best policy to be pursued. The majority, to which the ministers Plener, Giskra, Herbst, Hasner, and Brestel belonged, were unwilling to make further concessions to the Czechs, Poles, and other non-German nationalities, and desired to strengthen the authority of the central Reichsrath by a reform of the electoral law. The three other ministers, Taafe, Berger, and Potocki, favored concessions to the nationalities and to federalism. As the majority of both houses of the Reichsrath, which was opened on Dec. 13, 1869, sympathized with the majority of the ministry, the emperor in January, 1870, accepted the resignation of the minority. Soon, however, when the emperor refused to sanction several measures proposed by the new ministry which had been formed by Plener, a new ministerial crisis occurred, and Count Potocki was on April 4 commissioned to form another ministry. The overtures made by Count Potocki to the leaders of the Czechs and Poles, and the dissolution of the Reichsrath (May 23) and all the diets, produced an immense agitation, but the further development of the conflict was adjourned by the outbreak of the Franco-German war. The German centralists were not only dissatisfied with the cabinet of Potocki, but also with the chancellor, Count Beust, whom they likewise charged with making undue concessions to the nationalities. After the outbreak of the Franco-German war, the Austrian government gave new offence to the German Austrians by checking their enthusiastic demonstrations of sympathy with the cause of Germany. The Czechs and the Poles, on the other hand, made demonstrations in favor of France; and the leader of the Czechs, Dr. Rieger, even went so far as to make Napoleon a direct offer of an alliance between France and the Czechs, on condition that Napoleon should aid the Czechs in restoring the independent kingdom of Bohemia. The new kingdom was at once to embrace the Austrian provinces of Bohemia, Moravia, and Austrian Silesia, to which subsequently Prussian Silesia, Lusatia, and the Slovak districts of northern Hungary were to be added. In the new Reichsrath, which was opened on Sept. 5, the German liberals again controlled a majority of both houses. The provincial

diet of Bohemia, however, in which the united Czechs and federalists had a majority, declined to elect delegates to the Reichsrath. Although an imperial rescript of Sept. 29 made, in reply to an address from a Czech deputation of the Bohemian diet, promises of large concessions, such as the coronation of the Austrian emperors with the Bohemian crown and the indivisibility of the country, the Czechs persisted in their refusal. The government then ordered direct elections, by which 24 Germans and liberals and 36 adherents of the "declaration" were deputed to Vienna. The latter at once resigned their seats; but as both houses of the Reichsrath had a quorum, they soon passed a resolution declaring want of confidence in the ministry, which consequently tendered its resignation on Nov. 23. The emperor accepted the resignation, but the formation of a new cabinet was not accomplished until the beginning of the year 1871. The Czech leaders on Dec. 8 addressed, in the name of the "political nation of the Bohemians," a memoir to the Austrian chancellor, in which they explained their views on the foreign policy of Austria, and in particular declared their sympathy with Russia in the eastern question. On Dec. 14 the chancellor returned the memoir, informing the Czechs that the expression of such views exceeded their rights. On the other hand, a diplomatic correspondence of the most friendly character was begun in December with the government of Prussia, Austria waiving all opposition to the reconstruction of the German empire under the leadership of Prussia. The expected reorganization of the ministry took place on Feb. 7, 1871, under the presidency of Count Hohenwart. The new ministry leaned on the support of the Slavs and the feudal and Catholic parties. The Reichsrath declared itself dissatisfied with the policy of making concessions to the nationalities, but the emperor in stern words declared his approval. The majority of the Reichsrath, being divided in their opinions as to the best policy now to be pursued, granted the appropriations demanded by the ministry, and found some consolation in the fact that Chancellor Beust in the German as well as the Roman questions appeared to sympathize with the liberals. On the adjournment of the Reichsrath, on July 11, Count Hohenwart made some important concessions to the Czechs and the Poles. The latter appeared to be contented; but the Czechs insisted on the adoption of the whole of their demands. In August the ministry dissolved all the provincial diets in which the German centralists had a majority, and ordered new elections for the Reichsrath. The result gave to Count Hohenwart the assurance that now all the demands of the Czechs would be substantially granted, and the constitution as far as necessary be altered by the new Reichsrath. An imperial rescript to the Bohemian diet, which acknowledged "the rights of the Bohemian kingdom," caused unbounded enthusiasm among the Czechs. A deputation from the Bohemian diet officially presented in Vienna the fundamental laws on which they desired the *Ausgleich* (agreement) to be based. This presentation brought on a new crisis. A crown council, composed of the Cisleithan ministers, the ministers common to the whole empire, and Count Andrássy, was called to advise the emperor. Both Count Beust and Count Andrássy so energetically opposed the policy of Hohenwart that the emperor took sides with them. As the Czech leaders refused to consent to any modification of their programme, Hohenwart resigned on Oct. 25. A month later a new Cisleithan cabinet favorable to the German centralists was appointed, under the presidency of Prince Adolph Auersperg. Again the diets opposed to the new ministry were dissolved and new elections for the Reichsrath ordered; and again the ministry succeeded in securing a ministerial majority in the new Reichsrath. The speech with which the emperor on Dec. 27 opened the Reichsrath announced that the government would accede to the wishes of Galicia in so far as they were compatible with the interests of the empire, and that measures would be taken to make the Reichsrath a completely representative body. On Feb. 20, 1872, the ministry and constitutional party (*Verfassungspartei*) gained a great triumph, as the Reichsrath by 104 against 49 votes adopted an additional clause to the electoral law which authorized the government to order direct elections if delegates elected by provincial diets should resign their seats or be prevented from entering the Reichsrath. Another great triumph was obtained by the ministry in Bohemia, where it controlled a considerable majority in the new provincial diet. Of the 54 delegates whom the new diet sent to the Reichsrath, 40 were supporters of the ministry, which could now rely on a two-thirds majority in the Reichsrath even if the Poles should not vote for it. The session of the diet was closed on June 23. The two great reforms, the introduction of which had been regarded as the chief task of the ministry, the substitution of direct election to the Reichsrath for the indirect election of the delegates by the provincial diets, and the *Ausgleich* (agreement) with the Poles, were not yet carried through. The ministry offered to the Poles far-reaching concessions, but at the same time declared that nothing would be conceded incompatible with the dualistic basis of the entire empire. The Poles in turn promised that in their struggle for an autonomy like that of Hungary they would keep within the bounds of the present constitution of the empire. (See GALICIA, and HUNGARY.)—Among the best historical works on Austria are Mailáth, *Geschichte des österreichischen Kaiserstaats* (5 vols., Hamburg, 1834–'50); Lichnowsky, *Geschichte des Hauses Habsburg* (8 vols., Vienna, 1836–'44); Springer, *Geschichte Oesterreichs seit dem Wiener Frieden* (2 vols., Leipsic, 1864–'5); Bidermann, *Geschichte der*

östreichischen Gesammtstaatsidee (vol. i., Innspruck, 1867); Rogge, *Von Vilagos bis zur Gegenwart* (vol. i., Leipsic, 1872); *Archiv für Kunde der österreichischen Geschichtsquellen* (published by the Vienna academy of science, vols. i. to xliv., Vienna, 1848–'71).

AUSTRIA, an archduchy in the western half of the Austro-Hungarian monarchy, bounded N. by Bohemia and Moravia, E. by Hungary, S. by Styria and Salzburg, and W. by Salzburg and Bavaria; area, 15,056 sq. m.; pop. in 1871, 2,888,420. It is divided into two provinces or crown lands—Upper Austria (*Oestreich ob der Enns*) in the west, and Lower Austria (*Oestreich unter der Enns*) in the east, the river Enns forming part of the boundary between them.—Upper Austria has an area of 4,633 sq. m.; pop. in 1871, 735,622. The principal rivers are the Danube, which divides the province into two portions, the Enns, the Traun, and the Inn, tributaries of the Danube, and the Salzach, which flows into the Inn. In the S. W. are numerous Alpine lakes, some of them of considerable size. Mineral springs are found in various parts of the province, but few of them are of great value. The surface is mountainous. S. of the Danube the Noric Alps overspread the country, rising, in the group near Hallstadt, to the height of more than 9,500 ft. N. of the Danube the mountain system of Bohemia extends into the province, but attains no considerable altitude. The soil is exceedingly fertile in the valleys of the Danube and its tributaries, but elsewhere stony and dry. Even on the mountain slopes, however, the inhabitants have made it productive. The climate is bracing and cool, from the mountainous nature of the country. Agriculture and cattle-breeding are the principal occupations of the people. The salt works at Ischl and Hallstadt furnish an important industry, but the manufactures are not extensive, and consist chiefly of iron articles and cotton goods. Capital, Linz.—Lower Austria has an area of 7,656 sq. m.; pop. in 1871, 2,000,602. The principal rivers are the Danube, Enns, Leitha, Krems, March, and Thaya. The S. portion is occupied by a part of the Noric Alps, with their branches; the chief of these are the groups of the Wienerwald or Kahlengebirg, a spur of which, the Schneeberg, is 6,760 ft. above the sea. N. of the Danube chains of hills extend into the country from Bohemia, but there are no considerable peaks. The valley of the Danube is here broad and fertile, and the smaller valleys of its tributaries, especially in the northern part of the province, also furnish large tracts of arable land. The climate is somewhat warmer than that of Upper Austria. Agriculture is not carried to the perfection attained in that province; but the manufactures are much more numerous and flourishing. They include machines of many kinds, carriages, wagons, optical, musical, and mathematical instruments, metal wares, articles of leather work, silk, woollen, and cotton goods. Most of these are carried on in the neighborhood of Vienna. The province is intersected by several lines of railway, and there is a brisk trade with the neighboring states. Capital, Vienna. —The archduchy of Austria was the nucleus around which the empire of Austria (now the Austro-Hungarian monarchy) grew up. Lower Austria was founded as a margraviate in the time of Charlemagne; in 1156, joined with Upper Austria, it became a duchy, and in 1453 an archduchy. From this time the Hapsburgs steadily added to its territory, and it was soon merged in their increasing possessions.

AUSTRO-HUNGARIAN MONARCHY. See Austria.

AUTAUGA, a central county of Alabama, bounded S. by the Alabama river; area, about 650 sq. m.; pop. in 1870, 11,623, of whom 7,292 were colored. The Selma, Rome, and Dalton, and South and North Alabama railroads pass through the county. The surface is uneven and the soil fertile. In 1870 the county produced 191,158 bushels of Indian corn, 36,660 of sweet potatoes, and 7,965 bales of cotton. There were two cotton factories and a cotton gin factory, producing articles to the value of $681,733. Capital, Kingston.

AUTHENTICS, a Latin translation of the *Novellæ* of Justinian, so called by early writers from its being a literal translation of the original. The term was afterward applied to extracts of decisions from the *Novellæ* by which previous decisions or definitions contained in the Pandects or the Codex were modified or set aside. These extracts were made by doctors of the law and inserted in the *Corpus Juris*, but had no authority. The German emperors Frederick II. and III. issued in their names authentics, and ordered the civilians of Bologna to intercalate them in the code of Justinian. These last had a practical authority.

AUTO DA FE (Port., act of faith; Span., *auto de fé*), a public day held by the inquisition for the punishment of heretics and the absolution of the innocent accused. The term is also applied to the sentence of the inquisition read to the condemned just before execution, and to the session of the court of inquisition. (See Inquisition.)

AUTOLYCUS. I. In Greek legend, a son of Mercury and Chione, father of Anticlea, and thus maternal grandfather of Ulysses, who spent part of his youth at his residence on Mt. Parnassus. He was renowned for his cunning as a robber and a liar, and possessed the power of metamorphosing both himself and the things stolen. But Sisyphus overmatched him in cunning; for Autolycus having stolen his sheep and transformed them, he identified them by marks which he had made under their feet and compelled him to restore them. **II.** A mathematician of Pitane in Æolis, lived about 350 B. C. His treatises on the "Motion of the Sphere" and on the "Risings and Settings of the Fixed Stars" are the oldest extant Greek works on mathematics. Three MSS. of each exist at Oxford, but no complete edition

has been published. A Latin translation appeared at Rome in 1587–'8; and a full account of them is given by Delambre in his *Histoire de l'astronomie ancienne.*

AUTOMATON (Gr. *αὐτός*, self, and *μάειν*, to move), a self-moving machine, or one which contains within itself the moving power. This description would make the term applicable to watches, musical boxes, &c., but it is generally used to designate only those machines which are made to imitate the motions of men and animals. Those constructed to imitate men are sometimes called *androides*. Probably the earliest allusion to self-moving machines in history is to the tripods moved on living wheels, and instinct with life, which Homer describes Vulcan as having contrived. Then come the walking statues, female dancers, and wooden cow of Dædalus, whose invention appears to have been wonderfully prolific in automatons. Archytas constructed his wonderful dove 400 years before Christ. In later times we have Friar Bacon's brazen head which spoke, and the eagle and iron fly of Regiomontanus, the former of which is said to have flown from the city, saluted the emperor, and returned; and the latter after flying round the room returned to its master. But the love of the marvellous has no doubt greatly improved upon the feats of the earlier inventors. The first androides which acquired any celebrity was made by Albertus Magnus, in the 13th century; it moved like a man and even spoke. Thomas Aquinas is said to have been so alarmed by it, that he broke it in pieces with his staff, to the great grief of the unfortunate inventor, who exclaimed that he had destroyed the work of 30 years. Another similar invention of Descartes, which he named his daughter Francina, shared a similar fate; the captain of a vessel on board of which it was placed, thinking the devil must be in a machine that moved so like a human being, had it thrown overboard. Charlemagne received from Haroun al-Rashid a present of a water clock, in the dial of which a door opened at each hour, and when at noon the 12 doors were all thrown open, as many knights on horseback issued out, paraded round the dial, and then returning shut themselves in again. Similar contrivances are still extant in some ancient European cities, as Nuremberg in Germany and Heusden in Holland. A very amusing automaton group was constructed by M. Comus for Louis XIV., consisting of a coach and horses, a coachman, a page, and a lady inside. The figures all performed their appropriate parts; the coach was driven up to the king and stopped, and the lady, let out by the page, presented a petition, and reëntering the carriage was driven off. Next to Dædalus, Vaucanson, who lived in Paris in the early part of the last century, appears to have been possessed of the greatest skill in this department. He exhibited in 1738 a flageolet and tambourine player, which is probably the most perfect androides ever constructed, as his duck is no doubt the most perfect automaton. It played the flageolet with the left hand and beat the tambourine with the right, executing many pieces of music with wonderful accuracy. He also exhibited a duck in 1741, which moved, ate, drank, and even apparently digested and evacuated its food like a live duck. The figure would stretch out its neck to take food from the hand, and then would swallow it with the natural avidity of a duck, even the motion of the muscles of the neck being perceptible. It would rise up on its feet, walk, swim, dabble in the water, and quack, wonderfully imitating the natural actions of the duck. In its mechanism it was constructed in many parts—as in the wings—as nearly like those parts of the bird as possible. Vaucanson undertook, near the close of his life, to construct an automaton which would display all the mechanism of the circulation of the blood, the veins and arteries in which were to be of gum elastic; but the art of working this material was not then well understood, and there being long delay in the arrival of an anatomist sent by the king to attend to the work, Vaucanson became discouraged and gave it up. A father and son named Droz had the same remarkable talent. The former made a figure of a child, which sat at a desk, dipped its pen in the ink, and wrote in French. The latter, born in 1752, went to Paris at the age of 22 with a female figure which played different tunes on the harpsichord, following with its eyes and head the notes in the music book, and rising at the close and saluting the company. About the same time the abbé Mical made several automaton figures, some in a group, which played different instruments of music. He also exhibited at the academy of sciences two heads, which articulated syllables. Mälzel in the early part of the present century exhibited a famous automaton trumpeter at Vienna, which played many of the French and Austrian marches, and for many years afterward was exhibited by a travelling troupe in most of the cities of Europe. Still later is the automaton of the ingenious Swiss mechanic Maillardet, a female figure that performs 18 tunes on the piano, with the natural movements of the fingers and eyes and heaving of the bosom. It continues in action for an hour. With it are an automaton magician; a boy that writes and draws; a little dancing figure that moves to music from the glass case it is in; a humming bird that comes out of a box, sings, and returns; a steel spider; and a hissing serpent. Kempelen's automaton chess-player was no true automaton, but constructed to contain a person, by whose intelligence the movements were controlled and the game played. The doors of the machine were opened apparently to expose the whole interior; but they were never all opened at the same time. A person could thus move from one part of the interior to another, keeping himself concealed. Such a one, known to be a skilful chess-player, travelled with the exhibition, and was never seen

during the continuance of the game. A very ingenious automaton clarinet player was made by Van Oeckelen in Holland, and exhibited in New York about 1860. It performed operatic and classical selections, with accompaniment of other instruments played by living performers; it took the instrument from its mouth, moved its head and eyes, and bowed before the audience. It was wound up like a clock, and a drum, like that of a hand organ, was placed in its chest, a different one for every piece of music. The most perfect and latest is perhaps the speaking automaton of Faberman of Vienna, exhibited in New York in 1872. It is the result of a thorough physiological study of the human organs of speech, and their close imitation by the materials and mechanical arts of the present day. As these contrivances have no practical utility, serving only to display the ingenuity of the maker, their construction in the United States is confined to children's toys.

AUTOPLASTY (Gr. *αὐτός*, self, and *πλάσσειν*, to shape or form), a surgical operation by which the nose or other superficial portion of the body, being destroyed by accident or by disease, may be renewed or replaced by a portion of skin taken from another part of the same body. This art is said to have been practised in India from time immemorial. It was a custom to punish crime by cutting off the nose, or the lips, or the ears of the criminal; and for a time the parts were immediately replaced and found to grow again. To prevent this the excised parts were destroyed by fire; but the fact of the natural part adhering after it had been excised, and healing as a common wound, suggested the idea that a portion of skin removed from any other part of the body, and applied immediately to the mutilated part, might heal and become a natural substitute for the part removed. When the nose was cut off by the executioner, the surgeon cut a triangular portion of skin from the forehead, leaving it still attached by a small pedicle over the root of the nose, and, twisting it round, reversed it over the nasal region to supply the place of the nose which had been cut off. The skin adhered and the deformity was lessened, but a scar remained upon the forehead where the skin had been removed. This method was adopted in other countries, where the nose, the eyelids, or any portion of the face had been injured by accident or by disease. Celsus speaks of nasal and labial autoplasty. In the 15th century this art was practised in Calabria by the Branca family of surgeons, who introduced the practice of taking a portion of skin from the arm to replace a deformity in the face, instead of turning over a piece of skin from the immediate neighborhood of the part repaired, leaving a scar close by almost as bad as the original deformity. In the following century Lanfranc, an Italian surgeon, practised the art of nasal autoplasty with success in Paris; and the celebrated Gasparo Tagliacozzi (Taliacotius) practised the same art in Italy, and wrote his work on the art of autoplastic surgery, which is still in good repute. The last-named surgeon improved the operation to such an extent, and did so much to bring it permanently into recognition, that the restoration of the nose or other lost parts, when performed according to his method, received his name, and became known as the "Taliacotian operation." In the beginning of the present century this art was revived by the celebrated English surgeon Carpue, and has been much improved by Gräfe, Dzondi, Delpech, Cooper, Dupuytren, Roux, Lisfranc, Blandin, Velpeau, Lallemand, Dieffenbach, and other celebrated surgeons of the present time. New methods have been introduced, and almost any superficial portion of the body may be now repaired by autoplastic surgery. Three methods are adopted, the Indian, the Italian, and the French, and one or the other is preferred according to the parts involved. The Indian method, already described, consists in turning over a contiguous portion of skin to repair the deformity; the Italian method consists in taking a portion of skin from the arm, or from a distant portion of the body; the French method consists in loosening the skin on either side of the injury, so as to detach it from the parts beneath, drawing it together until it covers the lost part, and then uniting the borders, by suture pins and ligatures, until the parts adhere and grow together. This is far the best wherever it is practicable. The resources of this art are now very considerable, but skill is required to operate well, and judgment to decide whether it will be practically useful; for, where the general health of the patient is unfavorable, the operation may be unadvisable.—Different names are given to the operation, according to the parts repaired by this method: it is termed "blepharoplasty" when applied to the eyelids; "otoplasty" when applied to the ears; "rhinoplasty" when applied to the nose; "cheiloplasty" in reference to the lips; "palatoplasty" for the roof of the mouth; and "bronchoplasty" for the trachea.

AUTUMN (Lat. *autumnus*), the third season of the year. In the northern temperate zone it begins when the sun in its apparent descent to the southern hemisphere crosses the equatorial line, and ends at the period of the sun's greatest southern declination, or when he enters Capricorn. This astronomical autumn begins about Sept. 23, and lasts till about Dec. 21. But in popular language in the United States autumn comprises the months of September, October, and November; in England, August, September, and October. In the southern hemisphere, the autumn takes place at the time of our spring.

AUTUN (anc. *Bibracte*, afterward *Augustodunum*), a town of France, in Burgundy, department of Saône-et-Loire, on the Arroux, 50 m. N. N. W. of Mâcon; pop. in 1866, 12,389. It lies at the foot of a range of well wooded hills; the surrounding country is rich in vineyards and corn fields. The town contains many antiqui-

ties. Massive and curious fragments of the ancient Roman walls still stand; also the so-called temple of Janus, of imposing proportions and solidity. Besides these there are two curious Roman gates, the remains of an amphitheatre, and just without the gate a pyramidal mass of architecture, built probably for sepulchral purposes, but in whose honor antiquaries are in doubt. The town contains several fine specimens of church architecture, among them the cathedral of St. Lazare, Romanesque in style, and the chapelle St. Nazarre, interesting for its richly painted glass. Near Autun are the valuable coal basins of Épinac and Creuzot. The episcopal see of this city was once held by Talleyrand. The town figures in the history of Gaul as the capital of the Ædui. Under the Romans and the Franks it was often exposed to the ravages of war. Its vicinity witnessed considerable fighting in the war of 1870–'71, chiefly between the troops of Garibaldi and those of Gen. Werder. An attack on the town by the latter was gallantly repulsed Nov. 30, 1870.

AUVERGNE, an old province of France, now forming the departments of Cantal, Puy-de-Dôme, and part of Haute-Loire. It is divided into two parts, very different in their climate and productions. Upper Auvergne, which includes chiefly the departments of Cantal and Puy-de-Dôme, is a mountainous, wild, and picturesque cattle-raising district. The mountains which intersect it are a branch of the Cévennes, and lie in confused groups, sending up several summits to the height of 6,000 feet, some of which are extinct volcanoes. Mont Dore, the highest of them, is an almost isolated cone, and has its sides covered with scoriæ. Lower Auvergne extends along both banks of the Allier, and presents a continual succession of towns and villages, and of the most fertile hills and valleys of France, which produce abundantly the vine, grains, and fruits. The province takes its name from the ancient Arverni, one of the most powerful tribes of Gaul in Cæsar's time, of whom the present Auvergnats are supposed to be the almost unmixed descendants. Though their province has contributed a number of distinguished names to the history of their country, the Auvergnats are often spoken of as the Bœotians of France.

AUX CAYES, or **Les Cayes,** a seaport town on the S. W. coast of Hayti, capital of a department, situated on the bay of Cayes, in lat. 18° 11′ N., lon. 73° 50′ W., 92 m. W. S. W. of Port-au-Prince; pop. about 8,000, chiefly negroes and mulattoes. The exports embrace sugar, cotton, and coffee, and the trade is principally in the hands of British merchants. In the vicinity are many rum distilleries. A considerable smuggling trade is carried on with Jamaica. The hurricane of Aug. 12, 1831, destroyed part of the town, killing several thousand persons. The civil wars since 1868 have also proved injurious to Aux Cayes. The climate is unwholesome.

AUXERRE, a city of France, capital of the department of Yonne, on the left bank of the river Yonne, 90 m. S. E. of Paris; pop. in 1866, 15,497. Its wines are much esteemed. Its manufactures are calicoes, cloths, serges, druggets, earthenware, violin strings, &c. It has a college, a secondary ecclesiastical school, a museum of antiquities, a public library of about 25,000 volumes, a cathedral with a fine flamboyant Gothic façade, and the quaint church of St. Germain, with curious crypts, in which lie buried the mediæval counts of Auxerre and its vicinity (Auxerrois).

AUXONNE, a fortified town of France, in the department of Côte d'Or, on the left bank of the Saône, 17 m. S. E. of Dijon; pop. in 1866, 5,911. It has an arsenal and barracks, with manufactures of woollen cloth and nails.

AUZOUT, Adrien, a French mathematician and astronomer, born in Rouen, died in Rome about 1693. In conjunction with Picard, he applied the telescope to the mural quadrant. He invented and applied to the telescope a movable wire micrometer, on which he published a treatise in 1667. By the aid of this instrument he observed and measured the diurnal variation of the moon's diameter, first explained by Kepler. Auzout was an efficient optician and maker of telescopes. His observation and calculations of the comet of 1664 suggested to Louis XIV. the first idea of founding an observatory at Paris, and he was one of the original members of the academy of sciences, founded in 1666.

AUZOUX, Théodore Louis, a French physician and anatomist, born at St. Aubin d'Écroville, department of the Eure, about 1797. He is celebrated as the inventor of a new method of making permanent models of anatomical preparations in papier maché, an art known under the French name of *anatomie clastique.* The advantages of this method are: 1st, that the material used is light, not easily broken, and unaffected by the atmosphere at all ordinary temperatures; 2d, that minute parts can be represented in enlarged dimensions, and colored to imitate nature; and 3d, that the pieces representing the different parts of an organ and the different organs of the body can be separated from each other and put together at will. Dr. Auzoux completed his invention by 1825, and established a manufactory at St. Aubin for the production of anatomical models. He obtained a gold medal for his anatomical preparations at the French exposition of 1834, honorable mention in 1839 and 1844, and a second gold medal in 1849. He received the cross of the legion of honor in 1834. At one time he gave annual courses of lectures upon anatomy and physiology, illustrated by the aid of his own preparations. His published works are: *Considérations générales sur l'anatomie; Mémoire sur le choléra-morbus,* &c. (Paris, 1832); *Leçons élémentaires d'anatomie et de physiologie* (1839; 3d ed., 1858); *Des tares molles et osseuses dans le cheval* (1853);

Insuffisance des chevaux forts et légers, du cheval de guerre et de luxe, &c. (1860).

AVA (Burmese, *Ang-wa*, a fish pond, so called because the original town was built around one), formerly the capital of the Burman empire, styled in the official documents of the country *Ratanapura*, the city of gems, situated on an island formed by the Irrawaddy river on the N., the Myit-nge on the E., and the Myit-tha, an offset of the Myit-nge, on the S., and on the S. E. angle by a canal, through which the waters of the Myit-nge flow, dug to defend that face of the city; lat. 21° 58′ N., lon. 95° 58′ E. The population was formerly from 30,000 to 50,000, but is now much less. Ava is divided into upper and lower, or inner and outer towns. Exclusive of suburbs, the whole place is about 5½ m. in circumference, and is enclosed with a brick wall 15½ ft. high and 10 ft. thick; an embankment of earth supports this wall on the inner side, and there is a small ditch on the outside. The inner town includes the palaces, royal pagodas, and other public buildings. The houses of the outer town are for the most part wretched huts of bamboos and mats thatched with grass. The residences of the chiefs and wealthy men are generally constructed of planks, and tiled; but the town is now decayed and desolate.—Ava was first made the capital about 1364; and since then the Burman kings have shifted the capital eight or nine times. In 1839 every substantial edifice in Ava was destroyed by an earthquake; in consequence of which Monchobo, the birthplace of Alompra, and once the seat of the court, again became temporarily the capital of the Burman empire. Afterward both Amarapura and Ava were honored by the preference of the kings, until within a few years, when the capital was fixed at Mandelay.

AVA, Kingdom of. See Burmah.

AVALANCHE (Fr. *avalanche* or *avalange*), a mass of snow precipitated from mountain sides to the lower levels. Avalanches are common in the Alps and Apennines, and several different forms of them are described. The drift avalanche is the light, dry snow swept from the mountains by strong winds, and accumulated in the valleys, sometimes to such depths as to bury the villages it falls upon. More destructive is that formed by the damp, cohering snow, which, beginning in a small rolling body, gathers with every turn increased proportions and velocity, and taking up in its progress loose rocks and earth, or the shattered limbs of trees, sweeps off not only houses and villages, but the very lands on which they stand. It is said that in the year 1500 100 men were buried by such an avalanche in the Great St. Bernard; and in 1624, in Italian Switzerland, 300 soldiers were thus engulfed, many of whom, however, were afterward dug out alive. The villages in the high valleys of the Rhône have been particularly exposed to these disasters. In 1827 the village of Briel in Valais was almost entirely covered with an avalanche. The rolling avalanches sometimes change in their descent to sliding masses, and these take in their progress every movable body, down to the solid rock of the mountains. Hills of gravel and loose rocks, covered with forests and dwellings, are thus carried down to lower levels, and in cases of vineyards thus removed, intricate questions of proprietorship have arisen. Ice avalanches are produced by the breaking of masses of ice from moving glaciers. (See Glacier.)

AVALLON, a town of France, in the department of Yonne, on the Cousin, 26 m. S. E. of Auxerre; pop. in 1866, 6,070. It is surrounded by a country renowned for fertility and beauty. It has considerable trade in wine, leather, and horns, and manufactures of wool.

AVALOS, Ferdinando Francesco d', marquis of Pescara, an Italian general of Charles V., born in Naples in 1490, died in Milan, Nov. 4, 1525. His ancestors came from Spain to Naples in the middle of the 15th century. In early childhood he was affianced to Vittoria Colonna, who was then only four years old, and he married her while he was still a mere lad. He distinguished himself at the battle of Ravenna, where he was wounded and captured. While in prison he dedicated to his wife a poem entitled "Dialogue of Love." Ransomed through the influence of a favorite of Louis XII., he distinguished himself at the battle of Vicenza in 1513; at Milan, which city he took from the French in 1521; and at Como, which he sacked contrary to his promise. In 1522 he took an active part against the French at Pavia, La Bicocca, and Lodi, and brought about the capitulation of Pizzighettone and Cremona, and the capture and sacking of Genoa. The decisive victory over Francis I. at Pavia (Feb. 24, 1525) was chiefly ascribed to the valor of Avalos, who was wounded, and received the congratulations of friends and foes. He was made generalissimo, but became unpopular because, after having joined the league of the duke of Milan for the expulsion of the Spaniards and Germans from Italy, he subsequently betrayed the scheme to Charles V. The crown of Naples, however, which was offered to him by the Italian princes in reward of his treachery, he refused by the advice of his wife.

AVARIS, a stronghold of the Hyksos in Lower Egypt. See Hyksos.

AVARS, a tribe of Turanian origin, who first appear in European history about the middle of the 6th century, when the bulk of them left their abodes between the Caspian and the Don, penetrated to the Danube, and settled in Dacia. They served in the army of Justinian, allied themselves with the Longobards against the Gepidæ, and finally occupied Pannonia and other parts of modern Hungary, and established their dominion over the Slavs north and south of the Danube. Their sovereigns were called khans. The mightiest among them was Baian (570–630), whose dominions extended from the

Elbe to the Black sea, and to whom the Byzantine emperors paid tribute. The Avars seized Dalmatia, and made inroads into Italy and into the heart of Germany. In 640 the Slavs revolted, and the dominion of the Avars over them came to an end; but they still maintained themselves in Pannonia. They allied themselves with Thassilo, duke of Bavaria, against Charlemagne; but that monarch finally broke their power (791 and 796). One of the Avar khans, Tudun, joined Charlemagne, and was baptized at Aix-la-Chapelle, but subsequently abandoned the emperor and fought against him until he was taken prisoner and beheaded. About 827 the Avars disappear wholly from history. They have been confounded with their forerunners the Huns, and with their successors the Magyars. The modern Avars of Lesghistan in the Caucasus have also been erroneously considered their kindred. Remains of the long-walled camps of the mediæval Avars are still to be seen near the Danube in Hungary.

AVATAR, a Sanskrit word, signifying "a descending," usually applied in a religious sense, and in reference to the incarnation of the Hindoo deities. Whence the doctrine of the avatar is derived is a point that has received no satisfactory solution. The most important avatars of Vishnu, one of the persons of the Hindoo trinity, are: 1, that of the fish, in which he preserved Manu, the first man, during a deluge; 2, the tortoise, when Vishnu supported the earth while the gods and the Asuras extracted the immortal drink (*amrita*) from the sea; 3, the boar, in which he slew the chief of the Asuras, the opponents of the gods; 4, the lion-man, in which he killed the deceased Asura chief's brother; 5, the dwarf, in which form he played a trick on King Bali, of whom he asked as much ground as he could measure in three strides, and the king having granted the request, the god, at once manifesting himself, strode over earth, air, and heaven; 6, the man Parasurama, the son of Jamadagni and Renuka, when he rescued the Brahmans from the tyranny of the Kshatriyas; 7, Rama, the son of King Dasaratha, when he destroyed various demons by exploits described in the Sanskrit epic of *Ramayana;* 8, Krishna, the greatest of the avatars, when he assisted the family of the Pandavas against the Kooroos, and conquered the wicked of the earth—the subject of the *Mahabharata;* 9, Buddha, in which he persuaded the Asuras, the ancient enemies of the gods, to abandon their faith in the Vedas; 10, Kalki, the name of the avatar of Vishnu when he shall come again to restore peace and purity on earth.

AVATCHA, Mount (Russ. *Avatchinskaya Sopka*), a volcano in Kamtchatka, near the S. E. coast, in lat. 53° 15′ N. and lon. 158° 50′ E., rising to an elevation of nearly 9,000 ft. It has a crater at its summit several hundred yards in circumference, and another on its side at an elevation of 5,000 ft. Among the last recorded eruptions are those of 1837 and 1855, when it discharged with great violence vast quantities of lava, stones, and water. S. of the mountain is the bay of Avatcha, on which lies the town of Petropavlovsk.

AVEBURY, a village in Wiltshire, England, 5 m. W. of Marlborough, notable as the site of the remains of the largest Druidical temple in Europe. In an open plain, free from trees, 650 blocks of stone, varying from 5 to 20 ft. above the ground, and 3 to 12 in breadth and thickness, were brought together. One hundred of these were set on end around an area 1,400 ft. in diameter; and these were enclosed by a ditch and mound with two breaks for openings. The area within the bank is over 28 acres. From the arrangements it has been conjectured that there were within this great circle two smaller circular temples, besides two avenues of great stones leading to the entrances from a distance of more than a mile. The remains have been almost entirely destroyed of late years, all that was capable of removal having been gradually carried away.

AVEIRO, a seaport town of Portugal, in the province of Beira, S. of the mouth of the Vouga, on a bay called the Barra de Aveiro, 37 m. S. of Oporto; pop. in 1863, 6,557. It is an episcopal see, and has an extensive trade in sea salt. In the 16th century it was a commercial place of great importance.

AVELLANEDA, Alonso Fernando de, the real or assumed name of the author of the spurious *Segunda parte del ingenioso Hidalgo D. Quixote* (Tarragona, 1614; French translation by Le Sage, Paris, 1704–'6). Though Avellaneda seems to have been known in an obscure manner to his contemporaries and to Cervantes himself, the authorship of the book, which appeared under his name many years in advance of the real second part of "Don Quixote," has been assigned, but without conclusive authority, to Luis de Aliaga, the king's confessor, and also to Juan Blanco de Paz, a Dominican friar. Cervantes refrained from noticing the publication until the 59th chapter of his own second part. Mr. Ticknor, in his "History of Spanish Literature," says of Avellaneda's book that, "if not without merit in some respects, it is generally low and dull, and would now be forgotten if it were not connected with the fame of Don Quixote."

AVELLANEDA, Gertrudis Gomes de, a Spanish poetess and novelist, born at Puerto Principe, Cuba, in 1816, died in Seville in June, 1864. Her father was a Spanish naval officer, after whose death she went to Spain, where her first drama, *Leoncia*, was favorably received at Madrid in 1840. In 1845 she was crowned with laurel in the presence of the court, and received a prize for a poem exalting the clemency of the queen. In 1846 she married Pedro Sabador, a young Spanish politician, who died in the same year. She afterward led a secluded life at Madrid and Seville. Her 2 vols. of lyrical poetry (2d ed., Mexico, 1852), her 16 dramas,

and her 8 vols. of prose writings secured for her a high reputation.

AVELLINO, a fortified town of S. Italy, capital of the province of Principato Ulteriore, 28 m. E. of Naples; pop. about 15,000. It has a cathedral, several fine public buildings, and a public granary. It is celebrated for its filberts, which are largely produced in the vicinity, and are hence called in Latin *nuces Avellanæ*, and in French *avelines*. There is also a large trade in chestnuts and grain, and manufactures of hats and cloth. At the village of Atripalda, 2 m. distant, are the remains of the ancient town of Abellinum, which being destroyed in the wars between the Greeks and Lombards, the inhabitants settled on the present site. The town has suffered much from earthquakes.

AVE MARIA, a short prayer much used in the Roman and Greek Catholic churches. The first clause is the salutation of St. Elizabeth to the Blessed Virgin, with the names "Maria" and "Jesus" added. The second clause is an acclamation employed by the fathers of the council of Ephesus and the people generally, to express their joy at the decision of the question raised by Nestorius whether Mary is truly the mother of God. It is usually joined with the Pater Noster.

AVENBRUGGER, Leopold. See AUENBRUGGER.

AVENTINUS, Mons. See ROME.

AVENTURINE, a variety of quartz, and also one of feldspar. The peculiarity in each, for which the name is given, is the play of reflected or refracted light from numerous points in the mass of the stone—the reflections being bright and sparkling, and of different colors, while the ground may be translucent with little brilliancy, and of a dull color. The effect is probably produced by the crystalline faces in the structure of the stone refracting the light differently. There are, however, some varieties, called also aventurine, in which the play of colors results from the presence of numerous little scales of mica, or other foreign ingredients, each of which reflects the light, and all together produce a similar effect to that of the true varieties of aventurine. An artificial glass of this name is manufactured at Venice, which is well adapted to ornamental purposes, being even more beautiful than the natural minerals. Within the glass are substances apparently vitreous, of great brilliancy, of the color of copper, and in very small crystals of the form of tetrahedrons. It is said to have been discovered by a workman in Murano through accident (*aventura*) letting fall brass filings into molten glass.

AVENZOAR (properly IBN ZOHR), **Abu Merwan,** an Arabian physician, born at Peñaflor in Spain about 1072, died in 1162. He began the study of medicine at the age of 10 under the direction of his father, who imposed upon him an oath never to make use of poisons. He was the preceptor of Averroes. Avenzoar tried to bring medicine within the range of experimental science. Several of his works, translated into Latin, have been published. His *Rectificatio Medicationis et Regiminis* was published at Venice in 1490 and 1496, with the remarks of Averroes in 1514, and at Lyons in 1851.

AVERAGE. I. General (sometimes called gross or extraordinary), in mercantile law, the contribution made by all the parties concerned in a sea adventure to make good an expense or loss sustained by one or more of them for the benefit of all. The fundamental principle of the law of general average, as expressed in Justinian's Pandects, and adopted by all commercial nations, though with considerable diversity of practice, comes from the Rhodian law, the first known system of marine law, which thus stated the rule: "If goods are thrown overboard in order to lighten a ship, the loss incurred for the sake of all shall be made good by the contribution of all." It would be difficult to set forth the essentials of a case for general average more clearly than they have been stated in the supreme court of the United States (Barnard *v.* Adams, 10 How. 270), Mr. Justice Grier delivering the opinion: "In order to constitute a case for general average, three things must concur: 1. A common danger, or a danger in which ship, cargo, and crew all participate—a danger imminent and apparently inevitable, except by voluntarily incurring the loss of a portion of the whole to save the remainder. 2. There must be a voluntary jettison, *jactus*, or casting away of some portion of the joint concern for the purpose of avoiding this imminent peril; or, in other words, a transfer of the peril from the whole to a particular portion of the whole. 3. This attempt to avoid a common peril must be successful. The right to contribution is not made to depend on any real or presumed intention to destroy the thing cast away, but on the fact that it has been selected to suffer the peril in place of the whole that the remainder may be saved." Not only the value of the property destroyed, but what follows as a necessary consequence of its destruction, as injuries to other goods, expenses of refitting, and the wages and provisions of the crew in the port of relief, are subjects of contribution. So is also ransom paid to a pirate, by both the common and civil law (the rule of which on this point has been repealed in England), and in general whatever necessary and voluntary loss or expense is incurred by a part for the good of all. Goods finally saved must contribute for loss sustained in procuring temporary safety. By the French ordinance, goods stowed upon deck are expressly excluded from the benefit but not from the burden of general average, since they are supposed to hamper the vessel and increase the danger; and such is the general tenor of both the English and American law. In the courts of all three countries, however, an established usage to carry upon deck, as with small coasting vessels, is allowed to take a case out of the operation of the rule. Both the continental and the American law is somewhat

more liberal than the English as regards the subjects of general average, but the difference consists not in the nature but in the application of principles. The victuals and ammunition of a ship do not contribute in a case of general average, nor whatever is necessary to the persons of those on board, as wearing apparel, &c., nor the passengers for their own safety, nor the crew for their wages, lest apprehension of personal loss should deter them from personal sacrifice. The rule of the civil law that "those things alone which pay freight contribute" is, with slight limitations, the general law on this point. The rate of contribution is in proportion to the safety obtained, according to value, not weight. The rules upon which this adjustment is made differ in different countries, and are not well settled anywhere. It is a matter of such nice calculation, that in most commercial ports the computation and adjustment of general average constitute a special branch of business, attended to by a special class of men. By the civil law, the master of the vessel was required to see to this; and the provisions of the French ordinance are somewhat similar, but are practically disused, the work being performed by *dépêcheurs*, as they are called. **II. Particular,** an almost obsolete barbarous expression, used to signify a partial loss, which must be borne by the immediate loser alone. **III. Petty Averages** are sundry small charges borne in common by the owners of a ship and cargo, like pilotage, towage, anchorage, light money, quarantine, &c.

AVERNO (anc. *Avernus*), a lake in Italy, about 8 m. W. of Naples, and near the ruins of ancient Cumæ. It lies in the crater of an extinct volcano, and, though less than 2 m. in circumference, is of great depth. It has no natural outlet, but an artificial passage for its waters into the gulf of Baiæ was made by Agrippa, who also connected it with the Lucrine lake. This latter passage was closed by a volcanic convulsion which in 1538 cast up a hill of considerable height in the place of the latter lake. No attempt has been made to reopen the communication thus obstructed; and as the subterranean tunnel which connected Averno directly with the sea has also been blocked up, the lake is again without an outlet. In ancient times, Avernus, with the wild and gloomy scenery about it, the pestilent vapors rising from its volcanic shores, and the prevailing belief in its unfathomable depth, was reputed the entrance to Hades, and was made sacred to Proserpine. By this path Ulysses, according to the legend, visited the ghosts of the dead, and here was also a famous oracle. The lake retains few of its ancient characteristics; the dense woods which anciently covered its banks were cut down before the time of Strabo, and the volcanic phenomena appear to have entirely ceased. The ruins of a Roman edifice, probably a bath, are on the S. E. border of the lake.

AVERROES, or **Averrhoës** (a corruption of Ibn Roshd), an Arabian philosopher, born in Cordova about 1120, died in Morocco, Dec. 12, 1198. Educated by eminent masters, he became, like his father, distinguished for his varied knowledge, and succeeded him in the office of mufti or chief judge in Andalusia, and subsequently held the same position in Morocco. He stood high in the esteem of successive rulers, especially of Al-Mansour; but the latter, yielding to those who could not reconcile the philosophy of Averroes with his professed devotion to the Koran, and perhaps also impelled by personal animosity, banished him for several years, but finally restored him to his office. He wrote on astronomy, particularly on the spots of the sun, and on many other scientific subjects; but he is chiefly celebrated as a commentator upon Aristotle and Plato. He grasped the ideas of the Greek philosophers, though he had no knowledge of the Greek language. The first complete edition of his works was published in Latin at Venice in 11 vols. (1552–'60), the commentaries filling 8 volumes, and 3 volumes containing his refutation of Algazzali's work against Greek philosophy, his great medical work, *Kulliyat* or improperly *Colliget* (of which several editions have been published), and miscellaneous treatises. As a philosopher he tended toward pantheism and materialism. His professed disciples were called Averroists. Leo X. issued a bull against his doctrines after they had been denounced by the university of Paris. Renan, in his *Averrhoès et l'Averrhoisme* (Paris, 1852), gives a full notice of his life and works, and characterizes him as the chief representative in the middle ages of the Peripatetic philosophy and of freedom of thought, and as exempt from all purely dogmatic and religious bias. Among other recent works relating to his doctrines is Müller's *Philosophie und Theologie von Averrhoës* (Munich, 1859).

AVERSA, a town of Italy, in the province of Terra di Lavoro, situated in a remarkably fertile region, 8 m. N. of Naples; pop. in 1872, 21,176. It contains a cathedral and many churches and convents, a foundling hospital, and a lunatic asylum founded by Murat, which was among the first to attempt curing the insane by occupation and recreation. The sparkling white Asprino wine of Aversa is often sold as champagne, and its sweetmeats, especially almond cakes, are great delicacies. Aversa was settled by the Normans, and granted in 1029 to Rainulf, one of their leaders, who received from the emperor Conrad II. the title of count of Aversa. In 1030 the inhabitants of the ancient city of Atella, the site of which is still visible in the vicinity, were removed hither. In 1061 the county was annexed to the principality of Capua, then a papal fief.

AVESNES, a town of France, capital of an arrondissement in the department of Le Nord, on the Helpe, 50 m. S. E. of Lille; pop. in 1866, 3,737. It is one of the fortresses which protect France on the east, built under the reign of Louis XIV. according to the system of Vauban. It was bombarded immedi-

ately after the battle of Waterloo, almost destroyed by the explosion of a magazine, and for some time occupied by the allies.

AVEYRON, a S. department of France, forming a part of the old province of Guienne, bounded by Cantal, Lozère, Gard, Hérault, Tarn, Tarn-et-Garonne, and Lot; area, 3,375 sq. m.; pop. in 1872, 402,474. It is named from an affluent of the Tarn, which rises in the department near its E. border, flows W. as far as Villefranche, and then S. to the confines of the department of Tarn. The Lot flows on the N. W. border. Aveyron is one of the most mountainous districts of France. It has mines of copper, lead, silver, zinc, iron, and coal; those of coal are among the most valuable in the country. Cattle are raised in great numbers. The famous Roquefort cheese is largely exported. The department is divided into the arrondissements of Rodez, Villefranche, Espalion, Millaud, and Saint-Affrique. Capital, Rodez.

AVEZAC. See D'Avezac.

AVICEBRON, or **Avencebrol.** See Solomon ben Gabirol.

AVICENNA (a corruption of Ibn Sina), an Arabian physician and philosopher, born in a village of Bokhara in 980, died in 1036 or 1037. He was educated at Bokhara, where he devoted himself to study with such extraordinary zeal that before he reached manhood he was already famous as a physician, and at 21 he had written an encyclopædia of science to which he gave the name of "Book of the Sum Total." He afterward wrote a series of commentaries on this work. He delivered public lectures on logic and astronomy in the house of a rich patron of learning at Jorjan in Khorasan, and afterward became vizier to the emir of Hamadan, at whose court he taught philosophy and medicine, closing his lectures every evening with feasting and dancing. Involved after the death of this prince in a secret correspondence with the ruler of Ispahan, he was thrown into prison, but made his escape to that city, and there spent the latter part of his life in prosperity. Before his death he reformed the excesses of his conduct, freed his slaves, and gave his fortune to the poor. His medical writings, which number over 60 distinct works, were long held in the highest esteem, and the most important of them, the *Kanun* ("Canon"), was for many centuries the standard authority even in Europe. It gave an excellent synopsis of the views of the ancient Greek physicians. It was published in Latin as early as 1473 (Padua), in Hebrew in 1492 (fol., Naples), and in the original Arabic in 1593 (fol., Rome). There were about 30 Latin editions of the "Canon" during the 15th and 16th centuries. Avicenna's principal philosophical work, the *Ash-Shefa*, or "Remedy," has never been printed.

AVIGLIANO, a town of S. Italy, in the province of Basilicata, 11 m. N. W. of Potenza; pop. about 10,000. It has a handsome collegiate church, a royal college, and several convents. A portion of the town was destroyed by a land slide in 1824.

AVIGNON (anc. *Avenio*), a town of S. E. France, in Provence, department of Vaucluse, 365 m. S. S. E. of Paris, situated on the Rhône, which is here crossed by an elegant suspension bridge built in 1844; pop. in 1866, 36,407. It is an archiepiscopal see, and has a lyceum, a seminary, a public library, museums of antiquities, paintings, and natural history, a botanical garden, an agricultural society, and an association called the academy of Vaucluse. Its industry is active, especially in the cultivation of madder, in the manufacture of silks,

Avignon, France.

colored cloths, and taffetas, and in copper, lead, and iron works. It carries on an extensive trade in the various productions of Provence, particularly in grains and highly esteemed red wines. The town is generally well built, in the form of an almost regular oval, and its walls, rather beautiful than strong, are flanked with towers, adorned with battlements, and surrounded by handsome boulevards. The streets are narrow, but there are magnificent wharfs along the Rhône and numerous ancient and remarkable edifices. Among the latter is the palace of the popes, a sombre Gothic structure of the 12th century, now transformed into a prison and barracks. This city was the capital of the Gallic tribe of the Cavares prior to

the conquest of Gaul by Julius Cæsar. It remained under Roman domination till the 5th century, when the Burgundians took possession of it. From the Burgundians it was taken by the Goths, who in turn yielded it to the Franks. The Saracens captured it twice, shortly before and after the battle of Poitiers (732), and both times were forced to abandon it by Charles Martel. It was a Carlovingian city for about a century and a half; then several times exchanged its masters, became a republic under the protection of the German empire, adhered to the Albigensian heresy, and was captured by Louis VIII. in 1226, who made it the common inheritance of two sons, through one of whom, Charles of Anjou, it became attached to the crown of Naples. In 1309 Pope Clement V., at the request of Philip the Fair, established himself at Avignon. The city and its dependencies were purchased by the supreme pontiff from Joanna of Naples, and all the popes from Clement V. to Gregory XI. (1309–'77) made their residence here. The last-named pope restored the papal see to Rome, but during the great schism, from 1378 to 1418, several of the rival popes resided in Avignon. The 14th century was thus the period of the town's greatest splendor. It then numbered about 100,000 inhabitants. Petrarch was among its many distinguished residents. After the close of the schism Avignon, which with its environs then formed the comtat de Venaissin, was governed by the legates of the pope, till in 1791 France succeeded, after various attempts, in reclaiming it. Twenty-one councils of the church were held in Avignon, from 1050 to 1725.

ÁVILA. **I.** A province of Spain, forming the S. W. part of Old Castile, and bordering on New Castile and Estremadura; area, 2,981 sq. m.; pop. in 1867, 176,769. The northern portion of the province is generally level, of moderate fertility, and the inhabitants are engaged in agriculture. The southern part is intersected by numerous rocky mountain ranges, with verdant valleys between. Here the raising of cattle is the most important branch of industry. The Alberche and the Adaja, respectively affluents of the Tagus and the Douro, are the principal rivers. Two centuries ago the province was wealthy and populous, but it has gradually decayed, in consequence of the burdensome manorial and feudal privileges, and the laws of entail and mortmain. Merino wool is the chief article of production. Besides the capital, it contains no town of importance. **II.** The capital of the preceding province, an episcopal city, situated on the Adaja, 53 m. W. N. W. of Madrid; pop. about 7,000. It had formerly a flourishing university and extensive woollen manufactures, but its ancient prosperity has departed. The city is encompassed by a wall, still in good repair, with towers of great strength. It has a fine old cathedral and a Dominican convent, both of which contain some beautiful monuments. The church of San Vicente, without the walls, said to have been erected in 313, is an interesting object.

AVLONA (anc. *Aulon*), a fortified town of Turkey, the best seaport of Albania, in the pashalic of Janina, on the gulf of Avlona; pop. about 8,000. The Christian part of its inhabitants are chiefly employed in commerce. The Turks manufacture woollen fabrics and arms.

AVOCET, or **Avoset** (*recurvirostra*), a bird of the order of the *grallatores*. There is but one European and one American species, which are very closely connected, and would at first sight, by an unpractised eye, be pronounced identical. The bill is long, slender, and reflected upward at the extremity. The bird is webfooted, but does not swim easily or willingly, though it wades quite up to the breast, for which it is admirably qualified by its long legs, which are naked up to the head of the thigh. The palmated webs of its feet enable it to stand and run, without sinking, over the soft mud of the seashore. It feeds on aquatic animals, such as the smaller conchifers and mollusks, and on the spawn of fishes. The American avocet, *recurvirostra Americana*, is thus described by Giraud in his "Birds of Long Island": Loral

Avocet.

space white; neck and fore part of the breast reddish buff; lower parts, back and tail white; wings black, with a broad band of white formed by the tips of the secondary coverts. Lower portion of the tibia naked. Legs blue. Length 18 inches; wing, 9. A few breed at Egg Harbor, where they are known as the "blue-stocking." It builds its nest of seawrack and dried sedge among tufts of long grass by the edge of some salt pool. It is common in all parts of the United States, especially in the fur countries.

AVOIRDUPOIS (Fr. *avoir du poids*, to have weight; or, possibly, as it was formerly spelled *averdupois*, from the old Fr. verb *averer*, to verify), a standard of weight, to which articles of merchandise sold by weight are referred, except the precious metals, gems, and medicines. The pound avoirdupois contains 7,000 grains; the pound troy contains 5,760. The ounces do not retain the same proportions, there being 16 to the pound avoirdupois, and 12 to the pound troy. The ounce avoirdupois is supposed to be the same as the Roman *uncia*, which, according to Dr. Arbuthnot, contained the same number of grains, viz., 437½; but it

is very unlikely that these small weights have been preserved uniformly the same for so long a period. The old term avoirdupois is first met with in 1532, in some orders of Henry VIII.; and in 1588 a pound of this weight was deposited, by order of Queen Elizabeth, in the exchequer, as a standard. This, when examined in 1758 by the committee appointed by the government, was found to be 1¼ grain deficient in weight; and the troy weight was thereafter made the standard. The standard grain, prescribed by act of parliament in the reign of George IV., is such that "a cubic inch of distilled water weighed in air by brass weights, at the temperature of 62° Fahrenheit's thermometer, the barometer being at 30 inches, is equal to 252·458 grains."

AVOLA (anc. *Abolla*), a town of Sicily, on the E. coast, 13 m. S. W. of Syracuse; pop. about 8,000. It was rebuilt after its destruction by the earthquake of 1693. The exquisite honey, so renowned in antiquity as honey of Hybla, is still produced in its vicinity. Avola has a tunny fishery and a refinery for home-grown sugar.

AVON, the name of several English rivers, the most important of which, the Upper Avon, rises near Naseby, in Northamptonshire, flows through the counties of Leicester, Warwick, and Worcester, and entering Gloucestershire, empties into the Severn near Tewkesbury, after a course of about 100 m. Stratford, the birthplace of Shakespeare, is situated on the bank of this stream.

AVON SPRINGS, a village of Avon township, Livingston co., N. Y., 19 m. S. S. W. of Rochester; pop. about 900. It is situated on a terrace 100 feet above the Genesee river, commanding beautiful views in all directions, and is reached by the Erie and New York Central railroads. The place is visited by large numbers in summer for its mineral waters, which are deemed beneficial in rheumatism, dyspepsia, and cutaneous diseases.

AVOYELLES, a parish of Louisiana, intersected by Red river, which joins the Mississippi near its S. E. angle; area, 800 sq. m.; pop. in 1870, 12,926, of whom 6,175 were colored. The surface is nearly level and is subject to inundation. The western portion is fertile. In 1870 the parish produced 175,330 bushels of Indian corn, 24,985 of sweet potatoes, 78,385 lbs. of rice, 10,139 bales of cotton, 325 hhds. of sugar, and 25,600 gallons of molasses. Capital, Marksville.

AVRANCHES, a town of France, in Normandy, capital of an arrondissement in the department of La Manche, situated on the Sée, within 3 m. of the sea and 66 m. S. of Cherbourg; pop. in 1866, 8,642. It stands upon a hill looking toward the Channel islands, and contains the remains of a fine cathedral, consecrated in 1121, and possessing the stone on which Henry II. of England knelt to do penance for the murder of Becket. The cheapness of living and attractive scenery of the town have made it a resort for English families. In the 14th century it came into the possession of the English, who retained it till 1450. Avranches has several public institutions, including a library, and some manufactures of lace and blonde.

AWE, Loch, a lake in Argyleshire, Scotland, 8 m. N. W. of Inverary. It is 24 m. long, and in few places more than 1 m. wide, encircled by rugged and precipitous mountains, the loftiest, Ben Cruachan, 3,670 feet in height. Its surface is dotted with small islands. On Innishail are the remains of a small Cistercian nunnery, and a churchyard containing many curious old tombstones. On Innis Fraoch are some traces of an ancient castle, formerly the residence of the chief of the M'Naughtons. Innish Chounel was for several centuries the residence of the Argyll family. The castle of Kilchurn, whose square tower was built in 1440 by one of the Campbells, the founder of the Breadalbane family, stands on a rocky point of land, near the head of the lake. It was garrisoned as late as 1745 by the king's troops, but is now deserted. Several small streams flow into Loch Awe, one of which connects it with Loch Avich, and another with Loch Etive, an arm of the sea. The lake is celebrated for its trout and salmon.

AX, a town of S. France, in the department of Ariége, 21 m. S. E. of Foix; pop. 1,679. It is situated at the foot of the Pyrenees, over 2,000 feet above the level of the sea, in the midst of granitic mountains and at the junction of three valleys out of which flow the sources of the Ariége. It is celebrated for picturesque scenery, and especially for containing the greatest number and the hottest sulphurous springs in the Pyrenees. Near the hospital is a bath established in 1200 for the cure of leprosy, and still called leper's basin. Ax has been widely known as a watering place nearly 100 years, and contains now a number of bathing establishments, the so-called gun spring being the hottest. Over 50 springs issue from the junction of the slate and limestone with the granite, varying in temperature from a little over 100° to nearly 200° F.; and they burst forth so abundantly on all sides that the place has been figuratively described as being built over a subterranean reservoir of boiling water.

AXAYACATL, a Mexican emperor, died about 1477. He was the father of Montezuma II., and reigned 14 years. He was already famous as a warrior when he became emperor of the Aztecs, and inaugurated his reign by a successful expedition against Tehuantepec, and in 1467 conquered anew the cities of Cotasta and Tochtepec. A little later he repelled the tribes who strove to get possession of the Mexican capital, and maintained a vigorous warfare against his neighbors. He was defeated by the natives of Michoacan, whom he attacked with inferior forces, and on his return to Mexico celebrated funeral solemnities. He was preparing another expedition when he died suddenly and prematurely. The palace of Axayacatl, a gigantic pile of stone buildings, became

50 years later the barracks of the Spaniards. His treasures were discovered by Cortes within a concealed door, and the chronicler of the conquest exclaims that "it seemed as if all the riches in the world were in that room." They consisted of gold and silver in bars and in the ore, many jewels of value, and numerous rich and beautiful articles of curious workmanship, as imitations of birds, insects, or flowers.

AXE, an instrument for cutting down trees and chopping wood, usually formed of iron and steel, with a handle or helve, of suitable size and length for wielding with both hands, inserted in an eye running horizontally through the head. Smaller instruments of similar form, for use with one hand, are called hatchets (Fr. *hachette*, diminutive of *hache*, axe). The axe is one of the earliest tools suggested by the needs of man, and among all antique relics we find almost invariably some species of axe. The bone and flint tool of different Indian races; the metallic axe, mixed copper and tin, of South America and Mexico, sufficiently hard to cut porphyry and granite; the similar tool of the Romans; the Druidical copper axe, and the rough iron instrument of northern nations, all witness the primitive use of this implement. The increased science of more recent times constructs the axe of iron edged with steel; but anciently the use and combination of these metals were comparatively unknown. With the progress of civilization, the increasing wants of the race, and the colonization of new and fertile countries, the use of axes has proportionately increased with that of various other edge tools. In the most recent American processes, the iron used in making axes is hammered bar iron, the bars of different lengths, but definite sizes, differing for different tools; it is heated to a red heat, cut of the requisite length, and the eye which is to receive the handle punched through it; it is then reheated, and pressed between concave dies till it assumes the proper shape. The Spanish axe is made by the old process of hammering out the bar and turning it in a loop to make the eye, as this kind of axe has no head. The axe is now heated and grooved upon the edge, receiving in that groove the piece of steel which forms the sharp edge; borax is used as a flux, and at a white heat the axe is welded and drawn out to a proper edge by trip-hammers. The next process is hammering off the tool by hand or machinery, restoring the shape lost in drawing out; it is then ground to form a finer edge. The axe is now hung upon a revolving wheel in a furnace, over a small coal fire, at a peculiar red heat, judged by the eye, afterward cooled in salt and water, then in fresh water, and removed to another furnace, where it receives the last temper at the hands of skilled workmen. Then it is ground upon stones of a finer grain than before, and is ready for the polishing wheel. Next it is polished to a finish that shows every flaw, and enables it to resist rust and enter wood easily; next it is stamped, the head blacked with a mixture of turpentine and asphaltum to prevent rust, and finally weighed, labelled, and packed for sale.—Formerly the consumer depended upon the rude forges and limited skill of blacksmiths to supply axes, but since the increased demand there are many small manufactories in different parts of Europe and America. The largest establishment in the world for manufacturing axes and edge tools is that of the Collins company, situated on the Farmington river, at Collinsville, Connecticut. Here, by means of machinery invented for the company by Mr. E. K. Root, the processes of axe-making are brought to extreme perfection. The establishment was begun in 1826, on a small scale, by Messrs. S. W. and D. C. Collins. After some years it passed into the hands of a company, known now as the Collins company. The amount of capital invested here is $1,000,000. Eighteen hundred tons of iron, 350 tons of cast steel, and 7,000 tons of coal are consumed annually; from 450 to 500 men are employed; 13 large water wheels and two engines supply the motive power of the machinery; and from 1,500 to 2,000 edge tools and other implements are made daily. The largest American manufacturers after the Collins company are the Douglas axe company of East Douglas, Mass., and those of Cohoes, N. Y.

AXEL. See Absalon.

AXIM, a town of Africa, coast of Guinea, at the mouth of the Ancober, 73 m. W. of Cape Coast Castle. Until the year 1642 it was occupied by the Portuguese, when it was taken from them by the Dutch, who were confirmed in their possession by the treaty of Westphalia, and in 1872 ceded it with the remainder of their possessions in Guinea to Great Britain.

AXINITE, a mineral occurring in flat, prismatic crystals, with sharp edges, like an axe. It consists chiefly of silica, alumina, lime, and oxide of iron.

AXLE, a piece of timber or a bar of iron which supports the body of a car, carriage, or wagon, and is itself supported on two wheels, in the hubs or naves of which its ends are inserted. A great change was introduced about 45 years ago in the shape of axles for carriages, by the English invention of air-tight closed boxes, which with slight modifications has been adopted all over the world. The wheels of carriage axles are prevented from falling out by means of a collar on the axle, which enters the hub on the inside, and not by a nut and pin on the outside, as usual in common vehicles. The introduction of railroads has made another change necessary. Axles for railroads, instead of revolving in the hubs of the wheels, are strongly keyed in them, and journals are turned on the portions outside the wheels. These journals pass through and revolve in boxes attached to the frame of the cars. This arrangement has been found to resist vibrations and jerks resulting from high velocity much better than the old plan. It was, moreover, necessary

to insure a distance between the rims of the wheels invariably equal to that of the rails. It has been attempted to divide axles in the centre, the inner ends of the two half axles being maintained in boxes fixed in slides on a frame, and the body of the carriage acting as a lever on a small mechanism, and bringing each axle perpendicular to the curve of the road. One wheel has also been made to revolve around the axle, which was fixed to the other wheel, and turned with it; in this way railroad cars would turn a short curve without straining the axle. Such arrangements, however, have never been extensively introduced, as the disadvantages from complexity and loss of strength outweigh the advantages gained in turning curves. In horse cars running on city railroads, the difficulty of turning street corners, through curves of very short radius, is simply met by causing the outer wheel to run on its flange on a flat rail; it thus acts as a larger wheel and passes through a greater distance with the same number of revolutions as the inner wheel, and thus describes a curve, notwithstanding the wheels are all immovably connected with the axles. The difficulty of turning curves is not only in the straining of the axles immovably fixed to the wheels, but also in the rigid parallellism of the forward and rear axles, which opposes the turning of a curve the more in proportion as the car is longer; and as American passenger cars are very long and curves very common, the so-called truck system was adopted, consisting in a frame turning on a vertical axle or pivot, and supported by four or six wheels, of which the axles are parallel. Such a four or six-wheeled frame or truck is placed at each end of the car; and in going around curves the trucks adapt themselves by turning on the central vertical pivot. In Europe, where curves are more avoided regardless of expense, and cars are shorter, this system has not been adopted, except in a few exceptional localities, where curves of short radius could not be avoided in the construction of the road. The only kind of locomotive where the wheels are not immovably connected with the axle are those lately built for common roads, in some of which the connection is ingeniously made with a gearing, so that notwithstanding both wheels act as driving wheels, they are not compelled to make the same number of revolutions, and thus are able to turn any short curve in a common road.

AXMINSTER, a town in the county of Devon, England, on the left bank of the Axe, 24 m. E. by N. of Exeter; pop. 2,900. It is well known on account of its rich and beautiful carpets, woven in one piece, which rivalled those of Turkey and Persia; but the manufacture has now ceased. The town is mentioned in Domesday Book, and is believed to have existed from very early times. An action was fought near Axminster in the civil wars in 1644.

AXOLOTL, the Mexican name of an amphibious reptile, described by naturalists as *siredon*. This tadpole-formed reptile has the vertebræ biconcave, and the body elongated and formed for swimming. The feet are four, the anterior being four-toed, the posterior five-toed; the sides of the body are marked by several small furrows, and an imperfect lateral line is continued from the gills to the tail. The head is flattened, with a rounded or truncated snout, near the end of which are the nostrils; the eyes are small, and about midway between the angle of the mouth and the nose; the tail is elongated and compressed, and tapers to a point. A thin membrane commences near the back of the head, rising gradually to the middle of the tail, and diminishing again toward the tip; underneath, it extends from behind the vent to the tip, reaching its greatest height at its anterior third. The axolotl belongs to the perennibranchiate order, or those whose gills remain through life, coexisting with rudimentary lungs; hence its respiration is always aquatic. The gill openings are large, and the gill covers are continuous beneath the throat, so as completely to separate the head from the breast. The gills consist of four semicircular cartilaginous arches, serrated internally like those of fishes, and externally provided with

Axolotl.

fine branchial fringes, occupying thickly the lower edge of the flaps, and a few on the tip of the upper edge. The fringes are flattened, tapering, and disposed in a double row. A generic character is the presence of four external flaps, provided with respiratory fringes. There are two rows of teeth in the upper and lower jaw. There are three species described: *siredon Mexicanus*, Shaw; *S. maculatus*, Owen; and *S. lichenoides*, Baird. It is probable that other species exist, as there are many localities in Mexico, New Mexico, and Texas where "fish with legs" are common. The axolotl is about 10 inches long, of a dark brown color, with blackish spots. Great numbers are taken in the month of June from a lake about 3 m. from the city of Mexico, at an elevation of more than 8,000 feet above the level of the sea, and from water whose temperature is never below 60° F. At this time they form the principal food of the peasantry.—From the experiments of Prof. O. C. Marsh, it appears that the axolotl is the larval condition of the salamandroid batrachian *amblystoma*, usually regarded

as belonging to a distinct family. During an excursion in August, 1868, Prof. Marsh obtained from Lake Como, a small brackish sheet of water in Wyoming territory, several specimens of *siredon lichenoides* (Baird). On bringing them to New Haven, they went through a metamorphosis similar to that previously noticed by Duméril in the Mexican axolotl. The first indication of the change was the appearance of dark spots on the sides of the tail, followed soon by the disappearance by absorption of the membrane along the back and below the tail. Then the external branchiæ began to be absorbed, and the animal came more frequently to the surface of the water for air. The spots gradually extended over the body, the external branchiæ and branchial arches disappeared, and the openings on the neck were closed by the adhesion of the opercular flap. The body diminished in size; the head became more rounded above and more oval in outline; the eyes became more convex and prominent; the opening of the mouth grew larger, and the tongue considerably increased in size; changes took place in the teeth and in other parts of the structure, and finally the animal escaped from the water a true *amblystoma*, not to be distinguished from *A. mavortium* (Baird). The rapidity of these changes was greatly affected by light and temperature; under the most favorable circumstances the entire series of transformations took place in about three weeks. It is not known that these changes occur in Lake Como, which is about 7,000 feet above the sea; and the creature no doubt breeds in its siredon or larval state. This leads to the belief that all siredons are merely larval salamanders, and to the suspicion that many other so-called perennibranchiate batrachians, as *menobranchus*, *siren*, and *proteus*, may be the undeveloped young of other well known species.

AXUM, or **Axoom** (anc. *Auxume*), a city of Abyssinia, in the province of Tigré, formerly capital of a kingdom, in lat. 14° 5′ N., lon. 38° 27′ E., 12 m. W. of Adowa; pop. about 4,000. It is 7,200 ft. above the level of the sea. Parkyn visited this city in 1843. There stands in it a church considered the most sacred building in all Abyssinia, "around which lie scattered unfinished and broken columns, pedestals, and other remnants of the civilization of former ages." This church is about 200 years old. Near it is a square enclosure, with a pillar at each angle, and a seat and footstool in the centre, all of granite. Another footstool, standing apart, about 30 yards distant, has become celebrated for its Greek and Ethiopic inscriptions, the latter in such minute characters and so indistinct that the traveller Salt could transcribe but little of it. They give a list of tribes under the dominion of the king of Axum, and indicate the existence of an extensive and powerful kingdom in Abyssinia, where arts and arms were well known and cultivated. There were originally 55 obelisks at Axum. One of the most remarkable of these, a single shaft of granite, 60 ft. high, is still standing in good preservation. It is destitute of hieroglyphics, and, instead of ending in a pyramid like the Egyptian obelisks, terminates in a kind of patera, indicating that it is of Greek rather

Royal Seat, Axum.

than of Egyptian origin. Tradition says it was erected in the time of the emperor Aizanas (the middle of the 4th century). In ecclesiastical history there is preserved a letter of Constantius, addressed to Aizanas and Sazanas jointly, calling them the "Axumite princes." The stone also gives the name of the Abyssinian

Obelisk of Axum.

monarch as Aizanas, and mentions Sazanas. Axum was probably the first place in Abyssinia into which Christianity was introduced. It was formerly the centre of the ivory trade.

AYACUCHO. I. An interior central department of Peru, lying mainly on the eastern slope of the Andes, watered by the rivers Mantaro

(which partly bounds it N.), Pampas, and Apurimac; area, about 35,000 sq. m.; pop. about 150,000. Consisting partly of elevated plains and partly of deep valleys, it has a varied climate, cold in the one and excessively hot in the other. It is only partly included in the great metalliferous region; yet gold and silver are found in parts. Agriculture and bee-keeping are the principal industries; and there are many horses, cattle, sheep, llamas, and vicuñas. The department derives its name from a battle fought Dec. 9, 1824, near the hamlet of Ayacucho, between the Spaniards and South Americans, in which the former, though 9,310 strong, while their enemies numbered only 5,780, were totally routed, with a loss of 2,600 killed, wounded, and prisoners, the South Americans losing less than a thousand. The Spanish viceroy and commander, Laserna, was captured, and on the following day Gen. Canterac, who succeeded to the command, surrendered the rest of the army in the field, Laserna signing a capitulation, which delivered up all the Spanish troops, posts, and munitions of war in Peru. The South Americans were commanded by Gen. Sucre. This battle, which lasted only a few hours, virtually secured the independence of all the Spanish possessions in South America. **II.** A town, the capital of the preceding department, formerly called Huamanga or Guamanga, 220 m. S. E. of Lima, in a valley about 9,000 ft. above the level of the sea; pop. with suburbs, about 25,000. It was founded by Pizarro in 1539. The houses are generally of massive construction surrounded by gardens. The cathedral is a fine structure, and there are 23 other churches and chapels. It is one of the handsomest and most thriving cities in South America.

AYALA, Pedro Lopez de, a Spanish poet, chronicler, and soldier, born at Murcia in 1332, died at Calahorra in 1407. He held high offices under successive kings of Castile, was one of the supporters of Henry of Trastamare, and at the battle of Najera, in 1367, where he bore the banner of that leader, was made prisoner by Edward the Black Prince, and carried to England. He there wrote in prison his *Rimada de Palacio*, or "Rhyme of the Court." Having obtained his liberty, he returned to Spain, and was first minister of state, until in 1385 he was again taken captive in the battle of Aljubarota and carried prisoner to Portugal. He wrote a chronicle which begins at 1350, where that of Alfonso XI. ends, and embraces 46 years.

AYAMONTE, a city of Spain, in the province and 24 m. W. of the city of Huelva, near the mouth of the Guadiana; pop. about 6,000. The town is strongly fortified, but difficult of access, owing to the bar at the mouth of the river. The inhabitants are chiefly engaged in the sardine, tunny, and cod fisheries.

AYE-AYE, a curious animal discovered by Sonnerat in Madagascar, constituting the genus *cheiromys* of Sonnini. The common name seems to have been derived either from an exclamation of the natives or the cry of the animal; the generic name, meaning "handed mouse," implies its resemblance to a large rat, with feet like hands. Cuvier placed it among the rodents, near the flying squirrels, but he recognized the mouse-like structure of the head; Shaw, Schreber, and later Owen, ranked it among the lower quadrumana, the *lemuridæ;* while Van der Hoeven regarded it as a link between the monkeys and the rodents. Its probable place is among the quadrumana, near the lemurs, though it has interesting affinities to the rodents and bats. The incisor teeth are like those of rodents in number, position, and length of root, though more compressed laterally and sharp-pointed; the canines are absent; the molars are 4 above and 3 below on each side. In its head and general shape it resembles the galagos of the lemur family; the large, flat, erect, and naked ears are like those of the bats; the last two joints of the middle finger of the fore feet are very long, slender, and bare, useful in picking larvæ out of holes in trees, and perhaps in climbing; all the feet have 5 fingers, the thumbs of the hind feet being opposable to the others, as in the monkeys; the head is rounded, and the muzzle short and pointed; the tail is long, heavily furred, and trails upon the ground. The color is rusty brown above, the cheeks, throat, and under parts light gray; paws nearly black; the hair is thick and downy, of a golden tint at the roots. It is about the size of a hare, the tail being as long as the body. The movements are slow, but more active than those of the loris. The eyes are large, yellow, and sensitive to light, as in all nocturnal creatures. It is believed to be a burrower, though it is also found on trees. The food is probably both fruits and insects, as in the lemur family; it thrives in captivity on boiled rice. It sleeps by day, curled up in the hollow of a tree or other dark place. Unlike the quadrumana, this animal has the mammæ on the lower part of the abdomen, instead of upon the breast.

Aye-Aye (Cheiromys Madagascaricus).

AYASALOOK, or **Aiasaluk.** See EPHESUS.

AYESHA, or **Aïsha,** the favorite wife of Mohammed, born at Medina in 611, died there about 678. She was the daughter of Abubekr, and was but nine years old when she was betrothed

to the prophet, who cherished an especial regard for her, though she bore him no children. The 24th chapter of the Koran was written by the prophet expressly to silence those cynics who doubted Ayesha's purity. She survived Mohammed about 46 years, and had an active part in the contest against Ali, who took her prisoner with arms in her hands, but pardoned her. Her opinion was sought sometimes on difficult points in the Koran, and had the force of law with good Sunnis.

AYLESBURY, a market town, parish, and parliamentary borough of England, county seat of Buckinghamshire, 37 m. N. W. of London; pop. of the borough in 1871, 28,760. The town is very old and irregularly built, but well paved, and lighted with gas. Straw plaiting is extensively carried on, and ducks are raised in great numbers for the London market. The manufacture of lace, formerly an important industry, has diminished greatly of late years. There is one silk factory.

AYLMER, John, bishop of London, born at Tilney in Norfolk in 1521, died June 3, 1594. He was sent to Cambridge by the marquis of Dorset, afterward duke of Suffolk, but graduated in divinity at Oxford, after which he became the duke's chaplain and tutor to his daughter, Lady Jane Grey. On the accession of Queen Mary, in 1553, Aylmer was compelled to give up the archdeaconry of Stow in Lincolnshire, to which he had just been appointed, and fled to Switzerland. In his exile he published a reply to John Knox's "First Blast," against the propriety of women holding the sovereign sway, and complimented Elizabeth. Returning to England after the accession of the latter, he manifested much zeal in favor of the reformed faith, was made archdeacon of Lincoln in 1562, and was a member of the synod which reformed and settled the doctrine and discipline of the Anglican church. He was made bishop of London in 1576, and in this capacity became so unpopular, on account of his intolerance toward the Catholics and the Puritans, that the privy council rebuked his severity. He was a ripe scholar and a popular preacher, but published nothing except his courtly answer to John Knox.

AYMARAS, the name of the earliest known inhabitants of the Alpine valleys of S. E. Peru and N. W. Bolivia, whose descendants, save a few in the Peruvian province of Puno, are now to be found only in the Bolivian provinces of La Paz and Oruro. They claim descent from the Collaguas, who at a very remote period migrated from the north, and constituted the sacred isle in Lake Titicaca the centre of their government and religion. Though distinct in language, they physically resemble the Indians of the great Quichuan or Inca family, who were indebted to them for a part of their religious rites and the knowledge of the arts. They worked skilfully in gold and silver, tilled the ground, built splendid edifices ornamented with sculpture and painting, and were somewhat versed in astronomy. Their poetry and religion were spiritualistic; their priests were bound to celibacy, and the dead were held in religious veneration. Their skin is of an olive-brown color; their features, though regular, are strongly marked, the cranium capacious, and the general cast of the countenance thoughtful and melancholy. The women are rarely handsome. The Aymaras have embraced Christianity, and are zealous observers of all the rites of the Roman Catholic faith, in the performance of which, however, they introduce some relics of paganism. Their chief occupation is husbandry. As the Incas grew in power they gradually subdued the Aymaras, and ultimately overran their whole territory. The Aymaras probably number 200,000 at the present day. In early times they were accustomed to mould the craniums of infants to a conical shape. They worshipped

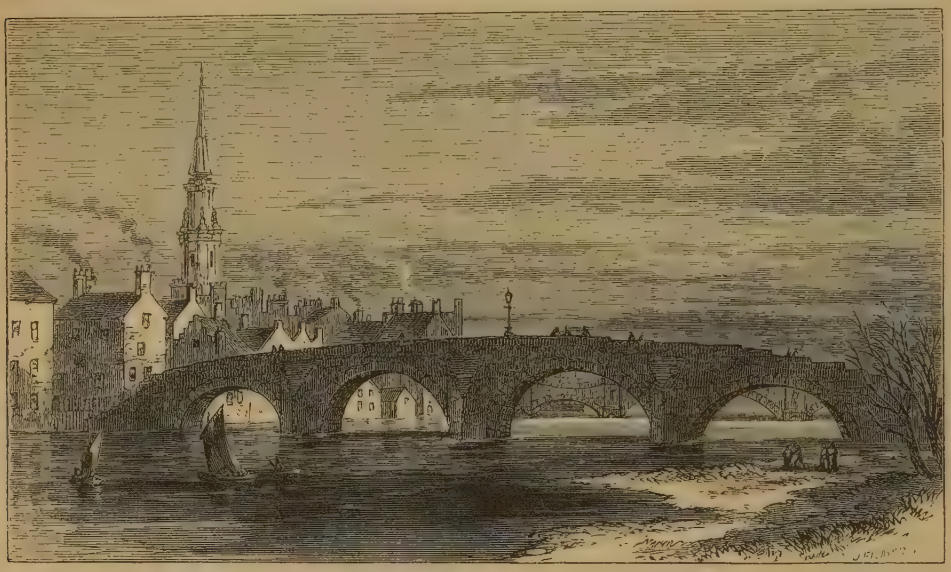
Aymaras, and an Aymara Tomb.

the sun, and believed the present luminary to be the fifth, and that, after a long period of darkness, it emerged from the sacred island in the lake. The monuments of Tiaguanaco, remains of many of which are still standing, indicate a much higher civilization than do those of Palenque. (See Titicaca.) Their tombs, sometimes large square buildings with a single opening through which the body was introduced, contained 12 bodies placed feet to feet around a confined cavity, sitting in their clothes. Some of these tombs are small houses of sunburnt bricks; some are square towers of several stories, containing each a body; but whatever be the size, they are always joined in groups, with the opening facing the east.

AYMAR-VERNAY, Jacques, a French peasant of Dauphiny, a pretended diviner, born at St. Veran, Sept. 8, 1662; time of death unknown. He was originally a mason, but early abandoned that occupation, and began using the divining

rod, employing it at first in discovering springs, mines, and hidden treasures, and finally in reclaiming stolen property and in detecting the thief. He acquired a great reputation in this way, and at length in 1692, a vintner and his wife having been murdered at Lyons, he was employed to follow up the murderer, and finally charged the crime upon a hunchback in the jail at Beaucaire, who confessed his complicity and was broken on the wheel. The country rang with these events, and innumerable pamphlets were written on the subject in 1692 and 1693. Aymar was invited to Paris by the prince de Condé to display his skill, but failed completely in everything he attempted, and at length admitted that he was an impostor. The mystery of the hunchback was never entirely cleared up.

AYR, the county town of Ayrshire, Scotland, on the frith of Clyde, near the mouth of the river Ayr, 30 m. S.W. of Glasgow; pop. in 1871, 17,851. The town is well built, and has commodious public buildings, a large fish market, and several pleasant squares. The Ayr is here



The Brigs of Ayr.

crossed by two bridges, celebrated by Burns in one of his best known poems. A good harbor is formed by the mouth of the river, but the town has little commerce, though it was formerly largely engaged in the importation of wine from France. The principal industries are fishing, rope and sail making, and iron founding. Ship building is also carried on to a small extent.—About two miles from Ayr, in what was formerly the parish of Alloway, is the small cottage in which Burns was born in 1759. A monument has been erected to the poet on a hill not far off.

Robert Burns's Cottage, near Ayr.

AYRER, Jakob, a German poet who flourished at Nuremberg, died in 1605. He is the author of upward of 60 comedies, tragedies, burlesques, and carnival plays, which were published at Nuremberg in 1618, under the title of *Opus Theatricum.* Tieck inserted five of these plays in the first volume of his *Deutsches Theater.*

AYRSHIRE, a county in the S. W. of Scotland, bounded W. by the frith of Clyde, and landward by the counties of Renfrew, Lanark, Dumfries, Kirkcudbright, and Wigtown; area, 1,149 sq. m.; pop. in 1871, 200,745. It is hilly on the southern and eastern sides, the principal hills rising to nearly 2,000 feet. It is intersected by several small rivers. About 10 m. off the coast lies the craig of Ailsa, the top of a submarine mountain with basaltic columns

similar to those of Staffa. The county abounds in coal, particularly that known as blende coal, which is found in a state of coke; iron, lead, antimony, and various kinds of building stone are also found; and there is a granite valued for mill stones, and a black stone used in building ovens. The county is remarkable for its fine crops and for the general prosperity of its farmers. The manufactures are considerable in linens, woollens, cottons, leather, and other articles. The relics of antiquity, Druidical and Roman, are numerous, while there are also many ruins of buildings of the middle ages. One of the most notable of these in point of interest is Turnberry castle, the ancestral residence of the Bruce. Capital, Ayr.

AYSCUE, Sir **George,** an English admiral, born about 1616, died about 1676. He entered the navy early, and was knighted by Charles I. In the civil war, siding with the parliament, he had command as admiral in the Irish seas. In 1651 he reduced Barbadoes and Virginia, which had held out for the king. In 1652 he seconded Blake in his contest with Van Tromp and De Ruyter. In June, 1666, in the memorable naval battle of the four days, he commanded a squadron, but his ship (the Royal Prince, the largest ship then afloat) running on the Galoper sands, his men forced him to surrender, and the Dutch captured his vessel. He was held a prisoner for several years.

AYTON, or **Aytoun,** Sir **Robert,** a Scottish poet, private secretary to the queens of James I. and Charles I., born at Kinaldie, Fifeshire, in 1570, died in the palace of Whitehall in March, 1638. When James VI. of Scotland became king of England, Ayton was rewarded for a very eulogistic Latin poem by knighthood, and several lucrative offices. His Latin poems, chiefly panegyrical, were published in his lifetime, and much esteemed. His English poems, principally preserved by tradition, were scarcely known until the Ballantyne club at Edinburgh printed a collection of them in their "Miscellany." Some years later a manuscript containing Ayton's poems was picked up at a sale, and the whole, edited by C. A. Pryor, were published in 1844. Burns greatly admired such of Ayton's poems as he had seen—among them the original of "Auld Lang Syne." Ayton was intimate with Ben Jonson and the leading literary men of his time.

AYTOUN, William Edmondstoune, a Scottish poet, born in Fifeshire in 1813, died in Edinburgh, Aug. 4, 1865. He was educated in the schools of Edinburgh, where he gained distinction in English and Latin composition. A prize poem, "Judith" (1831), received the applause of Prof. Wilson, whose daughter he afterward married; and encouraged by him he published his first volume, entitled "Poland and other Poems," which attracted but little attention. Mr. Aytoun was called to the bar in 1840, and became well known as a wit and as an advocate in criminal cases. In 1845 he succeeded Mr. Moir as professor of rhetoric and belles-letters in the university of Edinburgh, and the lectures which he delivered there were celebrated for their pithy treatment of topics and their brilliant style. He abandoned the liberal political views toward which he tended in his youth, and after the death of Prof. Wilson was the most prominent among the contributors to "Blackwood's Magazine." In this periodical first appeared his celebrated national ballads, "Lays of the Scottish Cavaliers and other Poems" (London and Edinburgh, 1849; 10th ed., 1857). Prof. Aytoun lectured with great success in London in 1853 upon poetry and dramatic literature, and in 1854 published "Firmilian, a Spasmodic Tragedy, by T. Percy Jones," designed to ridicule the raptures of some of the young poets of the day. He also took part in the "Book of Ballads," edited under the pseudonyme of "Bon Gaultier." His last poem was "Bothwell" (2d ed., 1856). He was one of the most effective of British political writers, and in reward for his services to the conservative party he was in 1852 appointed by Lord Derby sheriff and vice admiral of Orkney. Theodore Martin, one of his colaborers, has published a memoir of his life (1868).

AYUNTAMIENTO, the name of village and town councils in Spain. During the wars between the Moors and Christian Spaniards it was the policy of the sovereigns to induce inhabitants and cultivators to settle in the depopulated country as fast as it was recovered. As an incentive they granted to the villages and towns municipal privileges of a character derived from Roman antiquity, and totally antagonistic to the spirit of the feudal law. The town councils were to be composed of the judge, the mayor, the *regidores* or clerks, the *jurados*, and the *personeros* or deputies; all these were elective officers, except the judge or *corregidor*, who was appointed by the king. The only qualification for a citizen was Spanish birth, residence, and to be the head of a family. These privileges were consonant with the most ancient rights of the Spaniards and their Gothic conquerors, but now they were confirmed by *fueros* or charters. The only liability under which the districts thus organized were placed was that of paying a tax to the king, and of serving in arms in defence of the country, under their own alcalde. Their elections were by ballot; persons soliciting a vote or using undue influence were disfranchised. The king himself might not interfere with the proceedings of the ayuntamiento, which had supreme control of all local expenditure and taxation. All the citizens in these districts had equal rights. Noblemen had to lay aside their rank and exclusive privileges if they desired to reside in the district. There were no special privileges; all men and all religions were equal before the law. These regulations continued in force for centuries; but under the house of Austria and the early Bourbons they were frequently encroached upon, until at

the period of the French invasion, while the municipal organizations of the villages and unimportant towns had preserved their integrity, the charters of most of the great towns and cities of the kingdom had been violated, and the rights of the people abridged. During that invasion the constitution of 1812, recognizing and restoring all the ancient fueros, was adopted by the people. This constitution was abrogated by Ferdinand VII. on his restoration, revived by the revolution of 1820, and again suppressed in 1823. The constitution of 1837, however, restored the ayuntamientos. In 1840, in consequence of the check which this system of local government gave to the policy of the court, Queen Christina, by the advice of the French government, introduced a measure intended to restrain the political action of the ayuntamientos. This, although it at the time led to disturbances, was substantially carried out in 1844.

AZAÏS, Pierre Hyacinthe, a French philosopher, born in Sorrèze, Languedoc, March 1, 1766, died in Paris, Jan. 22, 1845. He was educated at the Benedictine college of Sorrèze, where his father was teacher of music, and at the college of the Oratorians at Toulouse, and afterward became secretary to the bishop of Oléron, but lost this position on refusing to take orders. He was at first a partisan of the revolution, but having published a pamphlet against its excesses, he was condemned to transportation. He found a refuge, however, in the hospital of the sisters of charity at Tarbes, where he served as secretary and bookkeeper. There he wrote his "Discourses of the Soul with the Creator," and his "Religious Inspirations, or the Elevation of the Soul to the Spirit of God." In these works he first put forth his ideas of eternal justice, and the natural and necessary balance of good and evil in the universe and in the destinies of men. After remaining 18 months concealed in this hospital, he retired to Saint-Sauveur, at the foot of the Pyrenees, and there wrote his book on the "Misfortunes and the Happiness of Life." Here he remained six years, engaged in writing his philosophical "System of Compensations," the best known of his works. He then went to Paris, married the widow of an officer, and was appointed professor of geography in the military school of Saint-Cyr. This office he resigned when the school was removed to La Flèche, and was afterward appointed inspector of bookselling at Avignon, where he published his great work, *Le système universel* (2 vols. 8vo, 1812). The following year he went to Nancy in the same capacity, and commenced a work on the destiny of man. At the downfall of Napoleon he lost his place, and retired again to Paris, where he lived some time in poverty; but his friends at length obtained for him a pension. He lectured publicly at the *Athénée Royal* in Paris, and attracted large audiences; and in 1827–'8 he held conferences in his garden in the suburbs of Paris, which were attended by the élite of both sexes. In 1826 he published his *Explication universelle;* in 1829, *Principes de morale et de politique;* in 1833, *Cours d'explication universelle;* in 1834, *Idée précise de la vérité première;* in 1835, *De la vraie médecine*, and *De la vraie morale;* in 1836, *Physiologie du bien et du mal*, for which the French academy awarded a prize of 5,000 francs; in 1839, *De la phrénologie, du magnétisme et de la folie;* in 1840, *La constitution de l'univers et l'explication générale des mouvements politiques*, for which the academy awarded another prize of 2,000 francs.

AZALEA (Gr. ἀζαλέος, arid), a genus of plants belonging to the natural order *ericaceæ*, and to the sub-order *rhodoreæ*, named in allusion to the dry places in which many of the species grow, and consisting of upright shrubs with large, handsome, and fragrant flowers, often cultivated in gardens. The genus comprises more than 100 species, most of them natives of China or North America, having profuse umbelled clusters of white, orange, purple, or variegated flowers, some of which have long been the pride of the gardens of Europe. The general characteristics of the genus are a 5-parted calyx, a 5-lobed, funnel form, slightly irregular corolla, 5 stamens, a 5-celled pod, and alternate, oblong, entire, and ciliated leaves, furnished with a glandular point. The species may be classified into those which have glutinous flowers, and those whose flowers are but slightly or not at all glutinous; each of which classes may be subdivided into those which have short stamens, and those which have stamens much longer than the corolla. Of those which have a glutinous corolla and short stamens are the *viscosa* and the *glauca*, very nearly resembling each other, found native in North America from Maine to Georgia, growing from 4 to 10 feet high, and having many varieties of flowers, either white or tinged with

Azalea viscosa

rose color. Of those which have a glutinous corolla, with long stamens, are the *nitida*, *hispida*, and *pontica*, the first two being American species and found in mountainous regions in the middle states, the last a native of Turkey and the northern borders of the Black sea, and distinguished by its brilliant yellow corolla. Of those whose flowers are smooth or but slightly glutinous, and have long stamens, are the *periclymena*, or upright honeysuckle, found on hillsides in all the woods of North America; the *canescens*, with a white flower which has a red tube, an early and tender American species; and the *arborescens*, a rare and beautiful shrub, with elegant foliage and very fragrant rose-colored blossoms, found about the Blue Ridge mountains of Pennsylvania. Of those whose flowers are not glutinous, and which have short stamens, are the *sinensis*, nearly resembling the *pontica*; the *indica*, a Chinese species, with brilliant variegated flowers, cultivated in Europe and America as a greenhouse plant; and the *lediifolia*, also a native of China, with evergreen leaves, and larger flowers than those of the preceding. All the American species are deciduous. In cultivation the azaleas love the shade and a soil of sandy peat or loam.

AZARA, Felix de, a Spanish naturalist, born in Aragon, May 18, 1746, died there in 1811. He became a brigadier general in the Spanish army, and was wounded in the warfare against the Algerine pirates (1775). In 1781 he went to South America as one of the commissioners for the settlement of the boundary between the Spanish and Portuguese possessions, and the researches which he prosecuted till 1801, despite the vexatious proceedings of the local Spanish officials, gave him distinction as an authority on the natural and political history of Paraguay and the Plata region. His *Essai sur l'histoire naturelle des quadrupèdes de la province du Paraguay* was first published in French (Paris, 1801), and afterward in Spanish (Madrid, 1802) under the auspices of his brother, the chevalier José Nicolas de Azara (born in 1731, died in Paris in 1804), Spanish ambassador to France, favorably known by a Spanish translation of Middleton's Cicero and by other literary achievements. Felix de Azara's masterpiece, *Voyage dans l'Amérique méridionale depuis* 1781 *jusqu'en* 1801 (4 vols., Paris, 1809), containing a narrative of the discovery and conquest of Paraguay and the Plata river, and in the last two volumes ornithological descriptions translated by Sonnini, was edited by the French naturalist Walckenaer, whose commentaries as well as those of Sonnini and Cuvier impart additional value to the work. A Spanish translation by Varela has been published at Montevideo.

AZARIAH (Heb. '*Azaryah*, or *Azaryahu*, helped of Jehovah), a very common name among the Hebrews. Uzziah, king of Judah, is also called Azariah. It was the Hebrew name of the friend of Daniel whose Chaldee name was Abednego. Apart from these, the most prominent persons bearing the name are a prophet who met Asa after his victory over Terah, king of Ethiopia, and exhorted him to put away idolatrous worship; and a high priest who aided Hezekiah in reforming the temple worship.—In its Greek form, Azarias, several persons of this name are mentioned in the apocryphal books, one of them being one of the generals of Judas Maccabæus, who suffered defeat by Gorgias.

AZEGLIO, Massimo Taparelli, marquis d', an Italian statesman, artist, and author, born in Turin, Oct. 2, 1798, died there, Jan. 15, 1866. In his youth, as he says himself in his memoirs, he was a swaggering soldier and a companion of scamps. His father being appointed in 1814 Sardinian ambassador in Rome, he accompanied him and remained there almost uninterruptedly for eight years, acquiring distinction as a painter, and for a time living the life of an artistic hermit in the outskirts of the Roman Apennines. After his father's death in 1830 he married a daughter of Manzoni, and after her death he married Louisa Blondel of Geneva. He was now a man of serious thought and strict virtue, and a decided liberal. His celebrated romances, *Ettore Fieramosca* (Milan, 1833) and *Nicolò de' Lapi* (1841), contributed to rouse the national spirit of independence and to establish his literary fame. In his *Degli ultimi casi di Romagna* (Florence, 1846), as well as by his personal influence with Pius IX., he advocated a liberal policy, while his political writings (collected in 1 vol., Turin, 1851) fostered a reformatory spirit in Sardinia and paved the way for coming changes. In 1848 he was aide-de-camp of Durando, who commanded the papal troops against Austria; but when the latter were recalled he joined the patriot volunteers in fighting the battle of Vicenza against Radetzky, and was severely wounded. After the restoration of peace he was chosen to the chamber of deputies. Victor Emanuel on ascending the throne appointed him (May 11, 1849) premier and minister of foreign affairs, and it was mainly his influence which saved constitutional institutions and paved the way for the work of Cavour. He dissolved the chambers twice on account of their opposition to the treaty of peace with Austria, which he caused to be ratified Jan. 9, 1850. Despite Azeglio's sympathies with progressive measures, he was considered as overconservative for the new order of things; and he finally succumbed to the combined influence of Count Cavour and Ratazzi and the opposition in the chambers, retiring Oct. 30, 1852. He had already tendered his resignation five months before, and continued in office only at the urgent request of the king. After the outbreak of the war of 1859, he contributed, as the king's commissioner in Bologna, to the preservation of order in the Romagna, and subsequently was for a short time prefect of Milan, his impaired health re-

quiring his retirement and obliging him to have his speeches in the senate read by others. A man of independent character and political opinions, he severely criticised Cavour, Mazzini, and other liberal leaders, and among other popular measures opposed the intended transfer of the capital to Rome. His daughter, the marchioness Ricci, has published his autobiography, or, as he designates it, his "moral autopsy," entitled *I miei ricordi* (2 vols, 2d ed., Florence, 1867; German translation, 1869). A supplementary volume of correspondence between Azeglio and Torelli has been edited by Paoli (Milan, 1870). In 1867 appeared in Paris his *Italie de* 1847–1865, and his *Correspondance politique*, edited by E. Rendu. Carcano published at Milan in 1870 Azeglio's *Lettere a sua moglie Luisa Blondel;* and Barbera of Florence has lately published his *Scritti inediti.*—His brother LUIGI, who died in Rome Sept. 24, 1862, was an eminent member of the order of Jesuits, editor of the ultra-clerical *Civiltà cattolica*, and the author of a work on natural and one on international law. His eldest brother, ROBERTO, who died in Turin, Dec. 24, 1862, published some excellent works on art, and was a promoter of political reforms toward the close of the reign of Charles Albert, a senator, and director of the royal gallery of paintings. The son of the latter, the marquis VITTORIO EMMANUELE TAPARELLI D'AZEGLIO, an accomplished artist, especially in statuary, was ambassador of Sardinia and afterward of Italy in London from 1850 to 1868.

AZERBIJAN, or **Azerbaijan,** a N. W. province of Persia, bounded N. and N. E. by the Russian dominions, E. by the Persian province of Ghilan, S. by Irak-Ajemi and Persian Kurdistan, and W. by Turkish Kurdistan and Armenia; area, about 30,000 sq. m.; pop. estimated at 2,000,000. It nearly corresponds to the ancient Median province of Atropatene, from which its modern name is derived. The country is mountainous, with fertile valleys and small plains. Mt. Savalan, apparently once a volcano, is upward of 12,000 feet high. The chief rivers are the Aras (the ancient Araxes), which flows along the N. border, and its affluent, the Karasu. The salt lake of Urumiah is in this province. The climate is generally healthy; the summers are very hot and the winters very cold. In the plains the pomegranate and olive thrive in the open air. The mineral resources of the province are not developed; but there are mines of iron, lead, and copper. The inhabitants are chiefly Mohammedans, but there are some settlements of Nestorian Christians. Capital, Tabriz.

AZEVEDO COUTINHO, Jozé Joaquim da Cunha, a Portuguese bishop, and the last inquisitor general of Portugal and Brazil, born at Campos dos Goitacazes, in Brazil, Sept. 8, 1742, died Sept. 12, 1821. He studied at Coimbra in Portugal, received orders, and soon became prominent both in the church and in Brazilian politics. He published in 1792 a work entitled *Ensaio economico sobre o commercio de Portugal e suas colonias.* In 1794 he was made bishop of Pernambuco. He published in London, in 1798, a pamphlet against the proposition to abolish the slave trade. Shortly before his death he was elected to the cortes as a representative of the province of Rio de Janeiro. He was named bishop of Elvas, but declined, and in 1818 was appointed inquisitor general. He wrote a memoir on the conquest of Rio de Janeiro by Duguay-Trouin in 1711.

AZEVEDO Y ZUÑIGA, Gaspard de, count of Monterey, and viceroy of Peru and Mexico, died March 16, 1606. He succeeded Luis de Velasco in the viceroyalty in 1603. He equipped a fleet to search for the great southern continent, which, under the command of Pedro Fernandez de Quiro, discovered several islands.

AZINCOURT. See AGINCOURT.

AZKAR TUARIK. See TUARIKS.

AZOF. See AZOV.

AZOIC AGE, the period in the earth's history preceding the appearance of vegetable and animal life. A few years ago life was not known to have existed below the lower Silurian rocks, in the Cambrian of England, or in the Taconic (Laurentian and Huronian) of this country. If, however, eozoön be admitted as an animal form, the first appearance of life is carried back in time very much; and now American geologists are disposed to admit an eozoic age between the Silurian and azoic.

AZORES, or **Western Islands,** a group of islands belonging to Portugal in the N. Atlantic, between lat. 36° 55′ and 39° 44′ N., and lon. 25° 10′ and 31° 16′ W., about 800 m. from the coast of Portugal; area, over 1,100 sq. m.; pop. about 250,000. They comprise three minor groups, the N. W. consisting of Flores and Corvo, the central of Terceira, San Jorge, Pico, Fayal, and Graciosa, and the S. E. of San Miguel and Santa Maria; and they extend from S. E. to N. W. about 400 m. The largest, San Miguel, is 50 m. long, and from 5 to 12 m. broad. They are all of volcanic origin, and have suffered severely from eruptions and earthquakes. A volcano rose suddenly to the height of 3,500 ft. in San Jorge in 1808, and burned for six days, desolating the entire island. In 1811 a volcano rose from the sea near San Miguel, and after vomiting ashes and stones disappeared. The peak of Pico, on the island of the same name, is 7,613 ft. high. All the islands are rugged and picturesque, with steep shores. The climate is moist but agreeable, and vegetation is luxuriant, fruits abounding, as well as the sugar cane, coffee, and tobacco. The principal exports are wine, brandy, oranges, lemons, beef, pork, and coarse linens, and their value is about $1,200,000 annually. The imports, valued at $1,700,000, comprise woollen and cotton goods, iron, glass, pitch, timber, rum, sugar, tea, coffee, fish, &c. The tonnage entered in 1867 was 119,271; cleared, 117,690. There are no good harbors, the least exposed being Angra, on the island of Terceira.—The Azores were laid down on the

maps of the 14th century, but little was known of them till 1432, when they were occupied by the Portuguese, being then uninhabited, and were named *Açores* from the great number of hawks (Port. *açor*, hawk) observed on them.

AZOTE. See NITROGEN.

AZOV, or **Azof,** a town and fortress of Russia, in the government of Yekaterinoslav, on the river Don, about 7 m. from its entrance into the sea of Azov, 24 m. S. E. of Taganrog; pop. about 6,000. Built in a remote time near the ancient Greek colony named Tanaïs, it carried on an extensive commerce with the northern peoples; but the silt deposited by the river has blocked up the port, and its commerce has been transferred to Taganrog. In the 13th century Azov was taken by the Genoese, who called it Tana; they were driven out in 1392 by Tamerlane. In 1471 it was taken by the Turks, who gave it its present name. In 1696 it was captured by Peter the Great. During the next century it changed hands several times between the Russians and the Turks; but in 1774 it finally fell into the hands of the Russians. It was bombarded and almost destroyed by the allies in 1855.

AZOV, or **Azof, Sea of** (anc. *Palus Mœotis*), an inland sea of southern Russia, lying between lat. 45° 20′ and 47° 20′ N., and lon. 35° and 39° E. The Turks call it Balik-Denghis, or Fish sea, from the abundance of fish in its waters. Its extreme length from N. E. to S. W. is about 235 m.; breadth about 110 m.; area, 14,000 sq. m. The waters are nearly fresh, very shallow, encumbered with sand banks, and navigable only by vessels of small draught. The sea is properly a gulf of the Black sea, with which it is connected on the south by the strait of Yenikale or of Kertch (anc. *Bosporus Cimmerius*), about 30 m. long. For four months it is frozen over, the navigation opening early in April and closing late in November. The Siwash, or Putrid sea, a western continuation of the sea of Azov, is cut off by a long narrow slip of land called the tongue of Arabat, and entered by the strait of Genitchi, at the north of the tongue. It is separated from the Black sea by the isthmus of Perekop. The Putrid sea is little more than a long reach of swamps. The Don is the largest river emptying into the sea of Azov.

AZTECS, properly the name of one only of the various tribes or nations who at the time of the conquest in the 16th century occupied the plateau of Anahuac or Mexico, though generally used as synonymous with Mexicans. These tribes were the Xochimilcos, Chalcos, Tepanecas, Acolhuas, Tezcucans, Tlascaltecas, and Aztecas, which collectively bore the name of Nahuatlecas, and their language was called Nahuatl. Tradition variously represents these families as emerging from seven caverns in a region called Aztlan (from the Nahuatl words *Aztatl*, heron, and *tlan* or *titlan*, place or place of), or as wandering away from their fellows subsequently to a grand cataclysm, and after a distribution of tongues. These traditions, however, do not fall within the domain of history, and critical writers have generally preferred to confine their researches within the period fixed by the Mexican paintings or records. Several of these are in existence, and although differing considerably in their chronology, they do not carry back the history of the Aztecs and their affiliated tribes beyond the 11th and 12th centuries of our era. There is abundant evidence, nevertheless, that the plateau of Mexico was occupied for many ages anterior to the arrival of the Nahuatlecas by a people of much higher culture, of whose civilization that of the Aztecs was but a rude reflection. (See TOLTECS.) The locality of the traditional Aztlan has been a subject of much speculation. By some writers it has been supposed that this primitive seat of the Nahuatlecas was in Asia, and that the paintings, all of which depict the passage over a body of water in canoes or on rafts, represent

Aztec Warriors. (From a Mexican Sculpture.)

a migration to America from that continent. Most, however, imagine Aztlan to have been somewhere to the north of Mexico, beyond the river Gila, the so-called *casas grandes* found there having been erroneously thought to be the work of the Aztecs. (See CASAS GRANDES.) But it is worthy of remark that no native history, chronicle, or known hieroglyphic of the Mexicans assigns a northern origin to the Aztec tribes, except the relation of Ixtlilxuchitl, who wrote a considerable time after the conquest, and who in this matter only followed the Spanish authors who had preceded him. In the painting representing the migration of the Aztecs, originally published by Gemelli Carrera in his *Giro del Mondo*, the sign or hieroglyphic of Aztlan is accompanied by the representation of a teocalli or temple, by the side of which stands a palm tree—a circumstance which excited the astonishment of the cautious Humboldt, as opposed to the opinion that Azt-

lan was to be looked for in a northern latitude. The palm certainly points southward as the direction whence the traditional migration took place; and this indication is supported by the fact that a people speaking the same language with the Aztecs (the Nahuatl), and having identical habits, laws, and religious observances, existed as far south as Nicaragua, and at the time of the conquest occupied nearly the whole of the present state of San Salvador in Central America.—The next question concerns the date of the departure of the seven tribes from Aztlan. According to Gemelli's painting, this event happened in the year 1038 of our era; according to the astronomer Gama, in 1064. Veytia follows Gama; but Clavigero fixes the period nearly a century later, in 1160. But great uncertainty is attached to all dates previous to the foundation of the city of Tenochtitlan or Mexico, which all accounts concur in fixing in the year 1324 or 1325. Tradition and the paintings represent that various halts and stoppages took place after leaving Aztlan, before the seven tribes reached the valley of Mexico; and the time occupied is variously estimated from 56 to 163 years. According to the painting obtained by Boturni representing this migration, they made not less than 22 stoppages, varying from 4 to 28 years in length—altogether occupying 162 years, before reaching Chapultepec. It does not appear that the various tribes all arrived at the same time in the valley of Mexico, but came in and took up their positions successively. They found the country rich and attractive, and occupied by only a remnant of an anterior and powerful people, who had left numerous monuments of their greatness. From these they learned many of the arts of life, the cultivation of the soil, and the working of metals. At first they seem to have lived in harmony with each other; but gradually the stronger tribes began to encroach upon the weaker, which led to combinations for defence among the latter, and to a long series of bloody forays and wars. The Mexicans (subsequently so called from Mexi, one of their war chiefs) ranked as the seventh tribe, and seem to have assumed the name of Aztecas *par excellence*. They were established first at Chapultepec, but gradually encroached upon the Chalcos, and finally, under the lead of a succession of military chiefs, became the most powerful tribe in Anahuac, and established their imperial city in the lake of Chalco. This event took place in 1324 or 1325, under the reign of Tenuch, and the city was called Tenochtitlan, the place or seat of Tenoch or Tenuch. The site, like that of Venice—a few low islands in a great lake—was admirably chosen for defence, and the Mexicans exhausted their art in strengthening the position. It could only be approached over long and narrow causeways, easily defended, and which even the Spaniards were not successful in forcing. Commanding the lake with numerous fleets of boats, they were unassailable from the water. From this stronghold they gradually reduced their neighbors, their companions from Aztlan, or forced them into a kind of dependent alliance, which served still further to build up their power and influence; so that, at the time of the arrival of Cortes, the Mexican emperor exercised a qualified dominion over nearly all the aboriginal nations embraced within the present boundaries of the republic of Mexico. This power was often exercised without mercy, and many thousands of their captured enemies were sacrificed on the altars of their sanguinary divinities. How severely their yoke was felt, and how eagerly it was thrown off, is shown by the readiness with which the Tlascalans, their own kindred, joined the Spaniards in their attack on the Mexican capital.—The form of government among the Mexicans was an elective monarchy; and the legislative power resided wholly with the king. The administration of the laws belonged to certain judicial tribunals, and was conducted with great regularity and with Draconic sternness. Their religion was sanguinary in most of its practices; yet it combined the elements of a milder system, probably, than that of their Tulhuatecan predecessors, whose religion was closely allied to the Buddhist system of India. As essentially a warlike nation, they made the highest beatitudes of their faith the rewards of the bravest soldiers; and while the soul of the common citizen after death was believed to be subject to a purgatorial existence, that of the warrior who fell in battle was caught up at once to the abode of the gods, to the bosom of the sun, the heaven of eternal delights. In the arts, and especially in their architecture, the Mexicans achieved an advance corresponding with their numerical and political growth; and the islands, which at the outset supported only rude huts of cane and thatch, came finally to be covered with imposing edifices of stone and lime. Metallurgy was extensively practised, and gold and silver, copper, and a species of brass were well known and elaborately worked; but iron, except in its meteoric form, was unknown. For accounts of the political, social, and religious practices, customs, and organization of this interesting people, whose subversion forms the most dramatic incident in the history of this continent, see the works of Sahagun, Solis, Clavigero, Prescott, and Baldwin. The following chronological table is from an unpublished Mexican painting or MS., in the possession of Mr. E. G. Squier:

Aztecs leave Aztlan	A.D. 1164
Arrive in Valley of Mexico	1216
Tenotzinlatoani, founder of Mexico, commences to reign	1324
Acamapichtle, second king	1373
Huitzilihuitzin	1394
Chimalpopoca	1415
Itzcohuatzin	1423
Hue Monctęcumatzin (Montezuma I.)	1438
Axayacatzin, king	1471
Tiçoçicatzin ("Tizoc")	1480
Ahuitzotzin	1484
Monctęcumatzin (Montezuma II.)	1502
Entry of the Spaniards	1519

AZURARA, Gomez Eannes de, a Portuguese historian, born at Azurara, died in the latter part of the 15th century. Although he was early made a monk and admitted into the order of Christ, he passed his youth as a soldier, and in 1459 was appointed to reform the archives of the state. His principal work was a chronicle of the discovery and conquest of Guinea. This was discovered in the *bibliothèque royale* of Paris in 1837, and published (8vo, Paris, 1841) by the Portuguese ambassador at the French court, the visconde de Carreira, who transcribed the MS. with his own hand.

AZYMITES (Gr. *ἀ*, not, and *ζύμη*, leaven), a polemical term, applied to the western church by the eastern or Greek branch. About 1025 a controversy sprung up as to the kind of bread that ought to be used in the eucharist. The Latin church maintained that unleavened bread only was allowable, since, as they affirmed, the Lord's last supper having been held on the day before the Hebrew passover, unleavened bread was the only kind procurable. The Greek church endeavored to prove that the last supper did not take place on the day before the passover, and consequently that unleavened bread could not be had; moreover, they charged that the use of unleavened bread was a relic of Judaism. The term azymites was at first used as one of reproach, but was adopted as honorable by those to whom it was applied. The controversy raged long and high, the parties calling themselves azymites and prozymites, anti-leaveners and pro-leaveners.

B

B, THE second letter in all languages whose alphabets have a Phœnician origin, as Hebrew, Greek, Latin, English, French, German, Italian, Spanish, and Russian. In English, French, and German it is strictly a palato-labial, the sound being produced by compressing the air within the mouth, vocalizing it by the vibrations of the membranes forming the palate or roof of the mouth, the uvula at the same time closing the nasal orifices. The sound can be imperfectly formed and prolonged while the lips are tightly closed. The perfect sound is produced at the commencement of a syllable by a sudden opening of the lips for the passage of the vocalized breath; at the close of a syllable by suddenly closing the lips upon the vocalized current. It differs from P in that in sounding the latter the breath passes out without compression and vocalization. In Spanish, in later Latin and modern Greek, the prevalent sound of B is nearly identical with that of V, produced by pressing the upper teeth upon the lower lip, causing only a partial closure of the mouth, so that the sound can be indefinitely prolonged. Thus in modern Greek (as perhaps in the ancient), *βασιλεύς* is pronounced *vasilefs*, the *υ* having its consonantal sound. The Greek B sometimes, though not always, represented the Latin V; thus *Virgilius* was written Βιργίλιος or Οὐιργίλιος. The Hebrew *beth* has the sound of V except when a diacritical point indicates that it is softened to B. In the passage of a word from one language to another an interchange not unfrequently takes place between B and P, F (*ph*), V, and less frequently M. For example: Lat. *ab*, Gr. *ἀπό*, Eng. *off;* Gr. *βροτός*, Lat. *mor*[t]*s*. In German, B, chiefly at the end of words, is often pronounced like P; thus, *ab* like *ap*. The sound of B, being formed with the mouth closed, is wanting in many of the dialects of the American Indians, who enunciate almost wholly with the lips open.—In the calendar B is the second dominical letter. In music it is the seventh degree of the diatonic scale of C, and the 12th of the diatonic-chromatic scale. According to the tempered system of tuning, the ratio of B to the fundamental note C is $\frac{8}{15}$. In the ancient diatonic scale B was not used as a key-note, its fifth, F, being imperfect. In the German notation our B is called H, B flat, half a tone lower than B, being called B. As a numeral, *β* among the Greeks represented 2, and with a stroke beneath 2,000; among the Romans B was occasionally used to denote 300, and with a line above it 3,000.

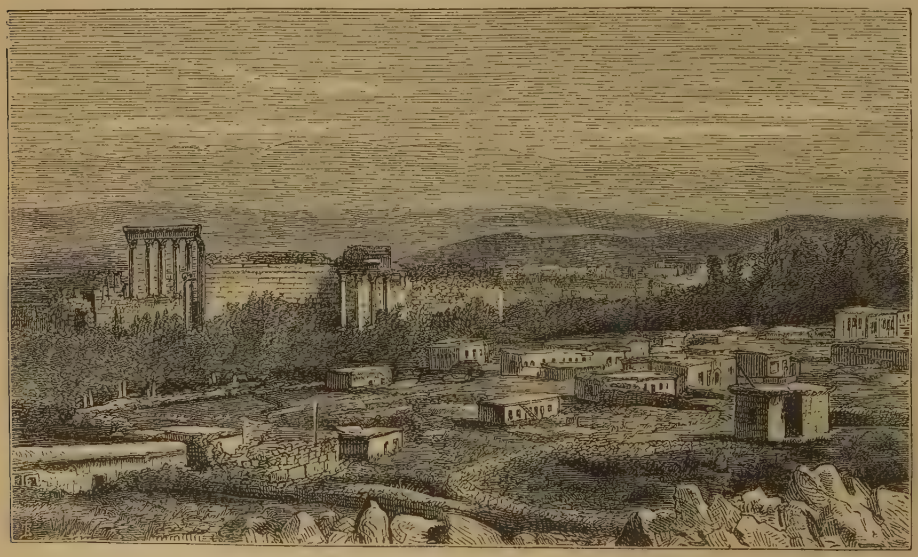
BAADER, Franz Xaver von, a German mystic, born in Munich, March 27, 1765, died there, May 23, 1841. After extensive studies he was appointed by the Bavarian government inspector general of mines, and in 1826 he became professor of philosophy and speculative theology at the newly established university of Munich. He was a devoted follower of Böhme, whose mysticism predominated in his philosophical theories and in his devout interpretation of Roman Catholic theology. He wrote on the natural sciences and technology, but his principal writings are metaphysical. In his *Fermenta Cognitionis* he extols Böhme as the greatest of thinkers. His chief disciple, Franz Hoffmann of Würzburg, has endeavored to reduce Baader's mystic aphorisms to a system, and has edited his complete philosophical works (16 vols., Leipsic, 1850–'60).

BAAL, a Semitic word signifying owner, lord, or master, and in the highest sense denoting the deity. The Hebrews never used it as a designation of their deity, but always to distinguish some god of the surrounding nations. In this sense, with some adjunct appended, it indicated several local deities: Baal-zebub was the fly god of the Ekronites, corresponding to the *Ζεὺς απόμυιος* of the Greeks; Baal-peor an-

swered to the Roman Priapus; Baal-berith, Covenant Baal, to Ζεὺς ὅρκιος and *deus fidius* of the Greeks and Romans. With the article prefixed, it designated the Baal or chief deity of the Phœnicians. Strictly Baal meant the highest male god (the sun or the planet Jupiter), as Ashtoreth or Astarte did the highest goddess (the moon or Venus), divinities from whom all things visible and invisible had their origin. The Greeks and Romans, however, sought and found analogies between the several Baals and some of their subordinate deities, as Mars and Hercules. The Bel or Bil of the Babylonians is closely related to the Baal of the Phœnicians, the former name being a contraction of the latter, or this a guttural extension of the former. Baal, Bal, and Bel, as prefixes or suffixes, enter largely into many proper names of places and persons. Such are Baal-zephon, Baal-gad, Baal-hamon, Jerub-baal, Eshbaal, Bal-adan, and Bel-shazzar. The Phœnicians carried the word through all their wanderings, giving us the Carthaginian Asdru-bal, Adher-bal, and Hanni-bal. They carried the name to Ireland, where we read of Beal or Bal, the ancient deity worshipped by Bal fires on the summits of the hills, and of Bel's cairns, where sacrifices were offered to Baal. The Greek Βῆλος and the Latin Belus are merely the Babylonian Bel with a terminal syllable, though the Greeks invented for him a descent of their own. Whenever the Israelites fell into idolatry, their natural tendency was to worship Baal, the god of the nations with whom they came into most immediate contact.

Baal.

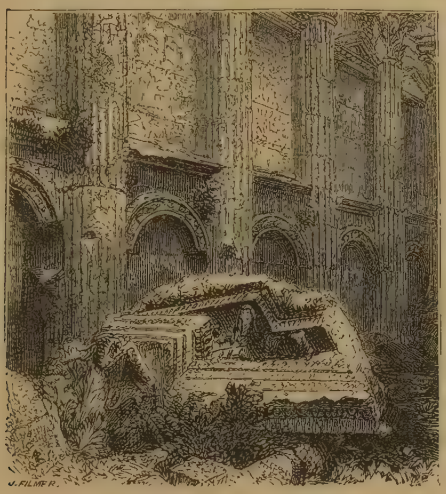
BAALBEK (in Phœnician, Baal of the valley, but rendered by the Greeks *Heliopolis*, city of the sun), an ancient city of Syria, in lat. 34° 1′ N., lon. 36° 11′ E., 36 m. N. by W. of Damascus, the ruins of which are the most imposing in the country, excepting those of Palmyra. The city lay in a plain of Cœle-Syria, fertil-



Ruins of Baalbek.

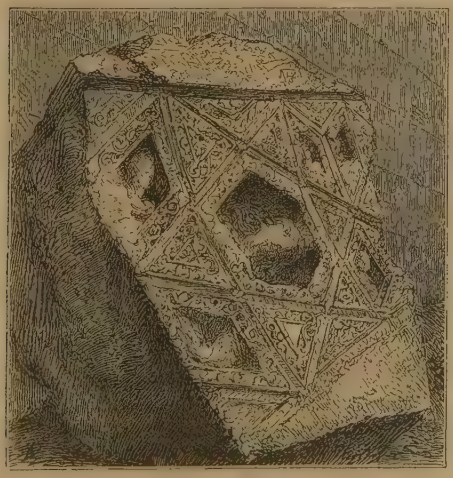
ized by streams rising in the range of Anti-Libanus. The date of its foundation is uncertain, the tradition which ascribes its erection to Solomon being wholly unsupported. It is mentioned under the name of Heliopolis by Josephus and Pliny. Lying in the direct route of trade between Tyre and the East, it rose to considerable importance, and was embellished with magnificent temples, the finest of which appear to date from the time of Antoninus Pius, A. D. 160, who built or enlarged the great temple, which was then considered one of the wonders of the world. When Christianity became the religion of the Roman empire, the heathen temples, except the great one, which was made a Christian church, were suffered to decay; but as late as the time of the Moslem invasion (635) Baalbek was the most splendid city of Syria, adorned with monuments of ancient times and abounding in luxury. It made a stout defence against the Moslem invaders, who imposed upon it a heavy ransom. For more than a century it continued an opulent mart, but was finally sacked in 748 by the caliph of

Damascus, the principal inhabitants being put to the sword. During the crusades it changed hands repeatedly. It was sacked by Tamerlane in 1400, and subsequently taken by the Metaweli, a barbarous nomad tribe, who were nearly exterminated by the Turks. In 1759 an earthquake completed its devastation.—The most promi-



Temple of Jupiter, Baalbek.

nent objects visible from the plain are a lofty portico of six columns and part of the walls of the great temple, and the walls and columns of a smaller temple a little below. The greater temple stood upon an artificial platform, between 20 and 30 ft. in height, and extended



Piece of Ceiling (fallen) in Temple of Jupiter, Baalbek.

1,000 ft. from east to west. It is probable that it was never completed. Approaching from the east, one entered a magnificent portico, 180 ft. in length and 37 in depth. Only the pedestals of the columns now remain; the vast flight of steps which led up to it have also disappeared. The great portal, 17 ft. in width, leads into a hexagonal court about 200 ft. in diameter, in a ruinous condition; on its western side another portal, 50 ft. wide, brings one to a quadrangular court, 440 ft. in length by 370 in breadth. Around the sides of this court are numerous exedræ, with columns in front, 30 ft. deep, and elaborately ornamented with carvings. The peristyle, 290 ft. in length by 160 in breadth, fronts upon the quadrangle; its columns, originally 54 in number, are about 76 ft. in height and over 7 in diameter, usually consisting of three blocks only. This magnificent edifice, of which only six columns now remain standing, was elevated some 50 ft. above the surrounding country, upon a platform, the western side of which contains three immense stones, whose united length is 190 ft., the largest being 64 ft. long, their average height 13 ft., their thickness still greater. The lesser temple, which like the other is of Corinthian architecture, stands upon a lower platform, a little to the south of the peristyle of its greater neighbor; its length, including the colonnades, was 225 ft., and its breadth 120. Its peristyle consisted of 44 columns, 45 ft. in height, of which only 19 remain standing. Some 30 rods distant stands a small circular temple, elaborately ornamented. The material used in the construction of the temples is a compact limestone, quarried in the hills south of the town. The ruins of Baalbek are apparently of two or three distinct eras. The huge stones which form the platform are of Cyclopean architecture. The Roman temples, which appear to occupy the site of an older structure, present some of the finest models of the Corinthian architecture. The modern village of Baalbek is little more than a heap of rubbish, the houses being built of mud and sun-dried brick. The population is about 2,000.

BAAN, Jan van, a Dutch painter, born in Haarlem, Feb. 20, 1633, died at the Hague in 1702. He confined himself almost exclusively to portraiture, and was an imitator of Vandyke, to whom he was little inferior in color and expression. He painted portraits of the most eminent men of his own country, and of Charles II. of England and many of his court. He declined an invitation of Louis XIV. to visit Paris, on the ground that it would be unbecoming in him to trace the features of the despoiler and conqueror of his country.

BABADAGH, a fortified town of European Turkey, capital of the Dobrudja, or N. E. Bulgaria, in the eyalet and 96 m. N. E. of the city of Silistria, near Lake Rassein, which is connected with the mouths of the Danube and the Black sea; pop. about 10,000. Near the entrance of the lake is the seaport of Kara Irman, through which Babadagh carries on an extensive trade. The town lies in an unhealthy situation between mountains and swamps. It is called after Baba the saint, whose adjoining tomb attracts Moslem pilgrims. It contains

five mosques, a college, and an aqueduct, and was of great strategical importance in the Turko-Russian conflicts of the 18th century and in the Crimean war, when the forts were ineffectually bombarded by the Russians (March 27, 1854).

BABBAGE, Charles, an English mathematician, born at Teignmouth, Dec. 26, 1792, died in London, Oct. 20, 1871. He was a fellow student of Sir John Herschel at the university of Cambridge, and was Lucasian professor there from 1828 to 1839. He became celebrated as the inventor of the calculating machine. (See CALCULATING MACHINES.) He was one of the founders of the royal astronomical society and of the British association, and the originator of the statistical society, and wrote extensively for scientific and philosophical periodicals on mathematics, magnetic and electric phenomena, mechanical science, geology, and statistics. Among his works are: "Letter to Sir Humphry Davy on the Application of Machinery to Mathematical Tables" (1822); translations, with Herschel and Peacock, of Lacroix's works on the differential and integral calculus; "Comparative View of the different Institutions for the Assurance of Life" (1826); "A Table of the Logarithms of the Natural Numbers from 1 to 108,000" (1826); "Reflections on the Decline of Science in England" (1830); "Economy of Manufactures and Machinery" (1832), which passed through many English editions and foreign translations, and has been called by Blanqui a hymn in honor of machinery; "A Ninth Bridgewater Treatise" (1837), defending mathematical studies from the charge of a tendency to infidelity; "The Great Exposition" (1851); and "Passages from the Life of a Philosopher" (1864). His house in London was for many years a centre of intellectual society.

BABCOCK, Rufus, D. D., an American clergyman, born at North Colebrook, Conn., Sept. 18, 1798. He graduated at Brown university in 1821, and was for two years tutor in Columbian college, D. C. In 1823 he was ordained pastor of the Baptist church at Poughkeepsie, N. Y.; in 1826 he became pastor in Salem, Mass.; and in 1833 he was elected president of Waterville college, Maine; but his health failing, he resigned in 1836, and accepted the pastorate of the Spruce street Baptist church in Philadelphia, whence he returned after three years to his first charge at Poughkeepsie. He was subsequently pastor of a church in Paterson, N. J., and has held successively the offices of secretary of the American and foreign Bible society, of the American Sunday school union, and of the Pennsylvania colonization society. He edited for five years the "Baptist Memorial," and has published a "Memoir of Andrew Fuller" (1830), "History of Waterville College" (1836), "Tales of Truth for the Young" (1837), "The Emigrant's Mother" (1859), "Memoirs of John M. Peck" (1862), &c.

BABEL, the Hebrew name for Babylon and the Babylonian empire. In the language of the Chaldeans it was probably *Bab-Il*, the "gate of (the highest) God;" but the Hebrew form is explained by *balal* (or *bilbel*), to confound, in allusion to the confounding of tongues consequent on the building of the tower of Babel. This tower was probably never carried to any great elevation, but a sacredness may have been attached to the spot on which it was to be built; and there, long after, was erected the pyramidal temple of Bel-Merodach, finally repaired by Nebuchadnezzar, the ruins of which, at Borsippa, are now known as Birs Nimrud (citadel of Nimrod). Except in one passage (Gen. xi. 9), there is no reference in Scripture to the tower of Babel; but we are told of a temple of Bel in which Nebuchadnezzar placed the spoils of Jerusalem, and probably those of his other conquests. Herodotus describes a temple of Belus, which according to him consisted of a "solid tower of a stadium in depth and width; upon this tower another is raised, and another upon that, to the number of eight towers." This general description tallies so closely with the mound of Birs Nimrud as to render it probable that this is the remains of the temple of Belus. The ruin presents the aspect of a huge irregular mound, rising abruptly from a wide desert plain, with masses of vitrified matter lying around its base. Its interior is found upon excavation to be composed of a mass of brick partially vitrified by fire, showing that it is the ruin of a structure into which combustible material largely entered. The bricks disinterred from the mound bear inscriptions in the cuneiform character, in most of which the name of Nebuchadnezzar appears. One of the inscriptions of this monarch reads: "A former king had built it (they reckon 42 ages); but he did not complete its head. Since a remote time the people had abandoned it, without order expressing their words. Since that time the earthquake and the thunder had dispersed its sun-dried clay. The bricks of the casing had been split, and the earth of the interior had been scattered in heaps." Attempts have been made to represent this temple of Belus, as restored and rebuilt by Nebuchadnezzar. That which appears most probable is by Sir Henry Rawlinson. He says: "Upon a platform of crude brick, raised a few feet above the alluvial plain, was built of burnt brick the first or basement stage, an exact square, 272 ft. each way, and 26 ft. in perpendicular height. Upon this stage was erected a second, 230 ft. each way, and likewise 26 ft. in perpendicular height, which, however, was not placed exactly in the middle of the first, but considerably nearer to the southwestern end, which constituted the back of the building. The other stages were arranged similarly, the third being 188 ft. square and 26 ft. high; the fourth, 146 ft. square and 15 ft. high; the fifth, 104 ft. square, of the same height as the fourth; the sixth, 62 ft. square, and again the same height; the seventh, 20 ft. square, and once more the

same height. On the seventh stage was probably placed the ark or tabernacle, which seems to have been again 15 ft. high, and must have nearly, if not entirely, covered the top of the seventh story. The entire original height, allowing three feet for the platform, would thus have been 156 ft., or without the platform 153 ft. The whole formed a sort of oblique pyramid, the gentler slope facing the N. E., and the steeper inclining to the S. W. On the N. E. side was the grand entrance, and here stood the vestibule, a separate building, the débris from which, having joined those from the temple itself, fill up the intermediate space, and remarkably prolong the mound in this direction." The several stories of this temple appear to have been painted in several colors: the lowest black, representing Saturn; then, in order, Jupiter, orange; Mars, red; the Sun, golden; Venus, yellow; Mercury, blue; the moon, silver. Above these was the shrine, in which, according to Herodotus, was a golden table, and a bed well furnished, but no image. Within the shrine, he adds, "no one remains over night, except a native female, one whom the god has chosen in preference to all others, as say the Chaldeans, who are priests of that god. These persons also say, asserting what I do not believe, that the god himself frequents the temple, and reposes on the couch." The purposes to which this temple became devoted from age to age may be gathered from the foregoing. Consecrated, perhaps, at first to the ambition of a monotheistic faith, it passed through several stages of Sabianism or worship of the host of heaven, until the rites performed in it sank into the gross idolatry of later times, and it was polluted by the vices which grow out of heathen superstition, as intimated by Herodotus. In one respect this temple, or rather series of temples built on the same spot, subserved a valuable purpose. The Babylonians were given to the study of astronomy; the temple served also as an observatory, from which the movements of the heavenly bodies could be watched. Assuming, which is probable, that the mound of Birs Nimrud represents the most important structure in ancient Babylon, it enables us to correct, at least approximately, the statements of the later historians as to the height of the walls which surrounded the city. This temple was at most only 156 ft. high, while we are told that the city walls were 300 or 350 ft., with towers having a height of 420 ft. These walls would therefore be nearly as high as the dome of St. Paul's, London (365 ft.), and the towers almost as high as the cross which surmounts the dome of St. Peter's at Rome (430 ft.). Of all human structures the apex of the greatest Egyptian pyramid (480 ft.) is the only one which greatly exceeds that ascribed to the brick towers of Babylon. The only other ruins which have in any way been proposed to be identified with the ancient Babel, are those now denominated El-Kasr and Babil, on the opposite side of the Euphrates, at a distance of about 12 m. from Birs Nimrud. (See BABYLON.)

BAB-EL-MANDEB (Arabic, "the gate of mourning," referring to the dangerous navigation), a strait uniting the Indian ocean (gulf of Aden) with the Red sea, separating Asia from Africa, and situated between the shores of Samhara and Arabia. The distance across, from the projecting cape Bab-el-Mandeb (anc. *Palindromus*) on the Arabian shore to the opposite coast of Africa, is about 18 m., the island of Perim and other smaller islands lying in the intermediate space, and dividing the strait into a western channel with a depth of 180 fathoms and an eastern one from 7 to 14 fathoms deep. The latter is most practicable for navigation. Perim, commanding the straits, has been in British possession since 1857; a fort has been built at Straits point, and a revolving light was erected in 1861.

BABER, Zahir ed-Din Mohammed, Mogul emperor, born in 1482 or 1483, died in December, 1530. He was a descendant of Tamerlane, his father being sultan of Khokan, a Tartar kingdom on the Jaxartes. On his father's death, which happened when he was 11 or 12 years old, the kingdom was seized by his uncle, the sultan of Samarcand, but Baber succeeded in maintaining his rights. Baber's early life was a succession of wars with his neighbors. He was obliged to fly, and went to Khorasan with 300 followers, where he sought assistance from the sultan, which was refused. A number of Mongols joined his standard, and Baber marched on Cabool in Afghanistan, which he captured in 1504. The following year he made an irruption into the Punjaub, but did not cross the Indus, and returned to Cabool. He became involved in dissensions in Khorasan in 1506, and for many years was occupied with attempts to recover his paternal possessions. In 1519 he again descended into Hindostan, crossed the Indus, and conquered some towns in the Punjaub. In 1524 he advanced to Lahore, which he captured and burned. The next year he advanced to Paniput, about 50 miles from Delhi. Here he encountered the troops of Sultan Ibrahim Lodi, the Afghan sovereign of Delhi, and completely vanquished him, April 27, 1526. Baber's lieutenants occupied Delhi and Agra, while his son Humayun routed another Afghan army, and Baber himself marched south against the Hindoos, and gained a victory over Rana Sanka, the most powerful of their princes. From this time Baber occupied himself in consolidating his extensive dominions. He made roads with stations for travellers; directed the land to be measured with a view to equable taxation; planted gardens and introduced fruit trees; and established a line of post houses from Agra to Cabool. To great political and military talents Baber joined literary tastes and accomplishments. He wrote a history of his own life in the Mongol language, which has been translated. He founded a dynasty in India which lasted almost three centuries, and

embraced among its members Akbar and Aurungzebe. He was succeeded by Humayun, the oldest of his three sons.

BABEUF, or **Babœuf, François Noël,** a French revolutionist, born in St. Quentin in 1764, executed at Vendôme, May 27, 1797. He began life as a surveyor's assistant. In his youth he was arrested on account of his subversive theories, and was also imprisoned on a charge of forgery, of which he was acquitted. He professed the fullest sympathy with the revolution in 1792, obtained several public offices, and in 1794 established, under the name of Caius Gracchus Babeuf, a journal called *Le tribun du peuple*, urging the most extreme socialistic action. His followers were called Babouvistes. In March, 1796, he organized a conspiracy for the overthrow of the authorities and the constitution, and for carrying his theories into practice by an equal distribution of property. Being betrayed in May, Babeuf and his principal adherents were arrested, and were tried at Vendôme in the following year. Babeuf and Darthé were sentenced to death, and attempted to commit suicide, but were still alive when carried to the scaffold. Of their accomplices 56 were acquitted, and 7 transported, including Buonarotti, who afterward published *Conspiration pour l'égalité dite de Babeuf*, with an account of the trial (2 vols., Brussels, 1828). Among Babeuf's works are: *Cadastre perpétuel* (Paris, 1789), and *Du système de dépopulation, ou la vie et les crimes de Carrier* (1794). Ed. Fleury refuted his theories in *Babeuf et le socialisme en* 1796 (Paris, 1851).

BABINET, Jacques, a French physicist, born at Lusignan, March 5, 1794, died in October, 1872. He was educated at the polytechnic school, taught mathematics, physics, and meteorology, and became a member of the academy and an astronomer in the bureau of longitudes at the Paris observatory. His scientific lectures, celebrated for their attractive style, were familiarly known in Paris as the *causeries du père Babinet.* He wrote in the annals of the academy and other periodicals on meteorological and mineralogical optics, terrestrial magnetism, the theory of heat, and the measure of chemical forces, and made important improvements in pneumatic machines, in hygrometers, atmometers, goniometers, and in geographical maps (*cartes homalographiques*); but his unfortunate predictions in regard to the failure of the Atlantic cable and to various meteorological phenomena have been much ridiculed. Among his works is *Études et lectures sur les sciences d'observation et sur leurs applications pratiques* (2 vols., Paris, 1855).

BABINGTON, Anthony, an English conspirator, born at Dethick house, Derbyshire, about 1566, executed in London, Sept. 30, 1586. He belonged to the Roman Catholic branch of an ancient and opulent family, and when hardly 20 years of age became the leader of a band of young Catholics who were fired with enthusiasm for their faith and for the rescue of Mary Stuart, then a prisoner near the Babington estates. Betrayed by one of their companions, Babington and his 13 accomplices were arrested and executed. On the day before his execution he wrote to Elizabeth, whose murder was a part of the plot, confessing his guilt and imploring pardon. The execution of Mary was hastened by her correspondence with Babington.

BABINGTON, William, an English physician, born at Portglenone, in the N. of Ireland, in June, 1756, died in London, May 29, 1833. He was early connected with Guy's hospital as an apothecary and lecturer on chemistry, and after 1797 became physician in that institution, and had an extensive medical practice in London. He laid the foundation of the geological society, and became its vice president and afterward president, making liberal donations to the museum and library. Having purchased the earl of Bute's fine mineralogical collection, he published "A Systematic Arrangement of Minerals" (London, 1795), and "A New System of Mineralogy" (1799). Among his other works was a "Syllabus of the Course of Chemical Lectures" (1802). His son-in-law, Richard Bright, M. D., published "Memoirs of the Life and Writings of William Babington, M. D."

BABISM, the doctrines of a Mohammedan sect which originated in Persia about 1843. Its founder appears to have been Mirza Ali Mohammed, a native of Shiraz, who, after making a pilgrimage to Mecca, undertook to form a new religion from a mixture of Mohammedan, Christian, Jewish, and Parsee elements. He took the name of Bab-ed-Din, "the gate of the faith," which he afterward abandoned, calling himself the "Point," or creator of the truth, (claiming to be not merely a prophet, but a personal manifestation of the Divinity, while the title of Bab was conferred upon one of his followers.) He sent out missionaries in various directions, the most celebrated of whom was a young woman, known in the sect as Gurret-ul-Ayn, or "Consolation of the Eyes." She was the daughter of Hadji Mullah, a distinguished jurist, and is said to have been remarkable for her personal beauty and intelligence. She set the example of appearing in public unveiled, and after preaching against polygamy and other Mohammedan practices, she finally left her husband and family, and devoted herself to the propagation of the new religion. Her purity of character was never questioned by either party. The adherents of the Bab soon became numerous. The late shah did not molest them, but on the accession of Nasir-ed-Din in 1848, apprehending a persecution, they took up arms, announcing the advent of the Bab as universal sovereign. Two large armies sent against them were routed, but the insurrection was at last crushed, and the Bab, who had held aloof from the revolt, was arrested. After 18 months' imprisonment he was put to death with one

of his disciples in 1850. This gave a new impetus to his doctrines. At an assembly of the leaders in Teheran a young man of 16, Mirza Gahara, son of the governor of the city, was recognized as Bab and took the name of "Eternal Highness." He ordered his followers not to take up arms again until he should give the signal. An attempt of three Babists, however, to assassinate the shah in 1852 led to a new persecution. Numbers of the believers were simultaneously executed at Teheran with horrible tortures, and among the victims was Gurret-ul-Ayn. She was treated at first with respect, being of noble rank, but finally, after being forcibly veiled, was sentenced to be burned alive. The executioner, however, smothered her before setting fire to the pile. The Bab himself was not captured. Since that time the Babists, as a secret sect, are supposed to have made great progress in Persia, India, and a part of Turkey.—The Babist doctrine asserts the unity of the Godhead, but upon this it engrafts many of the doctrines of the Gnostics and Brahmins. All beings are emanations from the Deity, and all will at the day of judgment be reabsorbed into the divine personality. The Bab has not revealed the whole truth, but will be followed by a successor who will complete the revelation. The Bab is superior to Mohammed, as Mohammed was superior to Jesus. The number 19 is sacred, for the original unity of the Deity consisted of 19 persons, of whom the Bab was the chief. At the death of a prophet or saint, his soul does not quit the earth, but joins itself to some other soul still in the flesh, who carries on his work. Babism enjoins few prayers, and only upon fixed occasions. Women are to discard veils, and share in the intercourse of social life. Concubinage and divorce are forbidden, and polygamy is discountenanced, though not absolutely prohibited.—See *Les religions et philosophies dans l'Asie centrale* (Paris, 1866), by Gobineau, who gives a translation of "The Book of Precepts," the sacred book of the Babists.

BABO, Franz Marius von, a German dramatist, born at Ehrenbreitstein, Jan. 14, 1756, died in Munich, Feb. 5, 1822. His *Otto von Wittelsbach* is, next to Goethe's *Goetz von Berlichingen*, the best German historical tragedy. His dramas have been collected in two volumes. (Berlin, 1793–1804.)

BABOON, a division of the monkeys of the old world, belonging to the genus *cynocephalus* of Cuvier. This genus is characterized by the position of the nostrils at the very end of the muzzle, which is lengthened and truncated; the teeth are 32 in number, as in man, but the canines are remarkably strong, and the last lower molar has a fifth point; the ridges over the eyes are very distinct, and the occipital crest for the origin of the powerful muscles of the skull and jaws is as large in proportion as in the true carnivora; the face is lengthened, giving the appearance of that of a dog, whence the generic name, and in the adult is marked with longitudinal furrows. All the species have cheek pouches and callosities. The baboons are among the largest of the quadrumana, and their strength is enormous; their disposition is fierce and malignant, and their habits are of the most disgusting character; they hardly possess a good quality, and are almost always rebellious in confinement and dangerous when at liberty. Their dispositions are exceedingly fickle, and they pass on the slightest provocation from a pleased condition into a paroxysm of rage. In a wild state they are very cunning, and when attacked are most dangerous enemies. When trained from their youth, they exhibit a considerable degree of docility; but they can never be trusted. They are semi-terrestrial; from the nearly equal length of the fore and hind limbs, they run well on the ground, and are also excellent climbers; their anterior extremities are remarkably powerful. Their food is principally vegetable, consisting of fruits, roots, the tender twigs of plants, and occasionally eggs and young birds; in a state of captivity they will eat almost anything. In some species the colors are bright, and the fur long and fine, forming a kind of mane on the upper parts. They are generally divided into two groups: the baboons proper, with long tails, the genus *cynocephalus* of Cuvier; and the mandrills, with short tails, of which Brisson has made the genus *papio*. There are six

Chacma (Cynocephalus porcarius).

well marked species of the former group: 1. The chacma, or pig-faced baboon (*C. porcarius*, Desm.), is a native of Africa, in the neighborhood of the Cape of Good Hope. The color is greenish or grayish black above, palest on the flanks and fore part of the shoulders; the hair on the neck of the male adult is long, like a mane, whence Geoffroy St. Hilaire's specific name of *comatus;* the face and extremities are violet black, paler round the eyes; the upper eyelids are nearly white; the tail is long and

tufted. This animal is exceedingly ferocious, even when brought up from youth in captivity; in its native haunts it hunts greedily after

Dog-faced Baboon (Cynocephalus hamadryas).

scorpions, which it devours alive in great quantities, having first, with exceeding quickness, broken off the end of the tail containing the sting. 2. The dog-faced baboon (*C. hamadryas*, Linn.), an allied species, inhabits Africa and the borders of the Persian gulf of Arabia. The color is blackish gray, tinged with brown; the hair on the fore parts is very long and shaggy; the face is flesh-colored; the females and young have short muzzles, of a bluish color. It is equally fierce and dangerous with the preceding, of which by some authors it is considered a variety. 3. The Guinea baboon (*C. papio*, Desm.) inhabits the coast of Guinea. The color is brown above, paler beneath; the cheeks are yellowish; the face, ears, and hands

Little Baboon (Cynocephalus babuin).

are black; the nasal cartilage exceeds the jaws in length; the upper eyelids are white. In the young the muzzle is shorter than in the adult, in this as in all the other species. This animal is of large size, and very fierce. 4. The little baboon (*C. babuin*, F. Cuvier) is supposed by its describer to be one of the quadrumana adored by the Egyptians, and frequently seen among their hieroglyphics, and is probably the *simia cynocephalus* of Linnæus. It inhabits northern Africa. The color of the male is a uniform yellowish green above, paler beneath; the face is livid; the nasal cartilage is not longer than the upper jaw; the tail, though raised at its origin, is of considerable length, reaching below the hams. 5. The ribbed-nose baboon (*C. mormon*, Desm., or *C. maimon*, Linn.) is a native of the Guinea coast, and is not uncommon in menageries. This and the next species, forming the genus *papio* of Brisson, have the tail very short (almost a tubercle), very large ischiatic callosities, a more elongated muzzle armed with formidable teeth and a greater size than any other

Mandrill (Cynocephalus mormon).

species, and the most fierce and disgusting characters of the baboon tribe. In *C. mormon* the colors of the adult are rich, and their effect is increased by the blue, red, and purplish tints of the face, nose, and naked parts of the skin; in the young the fur is of a uniform tawny green, paler beneath, and yellowish on the cheeks; in the adult male the color is olive-brown, mixed with gray above and white beneath, with a yellow beard, and the furrowed muzzle of a livid blue, with a bright red nose and dull flesh-colored lips; in the young the furrows do not appear, and the tints of the naked parts, as in the females, are less vivid. The species is usually called the mandrill. It recedes much in form from the typical quadrumana, and approaches the carnivora in its structure, instincts, and appetites; it has been known to tear to pieces and devour living prey with the ferocity of a tiger. 6. The drill (*C. leucophæus*, F. Cuv.), also a native of Africa, is

nearly as fierce and powerful as the mandrill. The color above is greenish brown, tinged with gray, beneath white; the face is a uniform

Drill (Cynocephalus leucophæus).

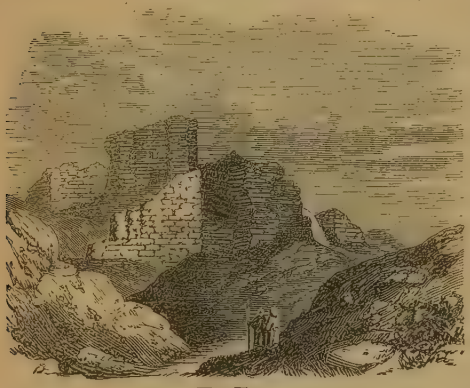
dull black, and the muzzle has no furrows; the under lip is red. The females are smaller in size, and of a duller color.—Other baboons are described, but not with sufficient exactness and authority to admit of a general recognition. Some species of the genus *macacus*, inhabiting India and its archipelago, have been incorrectly called baboons; among these may be mentioned *M. silenus*, Geoff.; *M. rhesus*, Geoff.; *M. nemestrinus*, Geoff.; and *M. niger*, Desm. These, with others, are intermediate between the guenons and the baboons, and in some respects resemble the true *cynocephali*. —A peculiar species has recently been intro-

Gelada (G. Ruppellii).

duced to the notice of naturalists by Dr. Rüppell in his work on the fauna of Abyssinia. This is the gelada (*gelada Ruppellii*), a large brown baboon, having, when full grown, a very remarkable shaggy mane around his neck and shoulders. About the paws the hair is nearly black. The young gelada is entirely destitute of the hairy mane, and is much lighter in color than the adult animal.

BABYLON (Gr. Βαβυλών, Heb. *Babel*), an ancient city in what is now Turkey in Asia, in lat. 32° 39′ N., lon. 44° 30′ E., lying on both banks of the Euphrates, or rather, perhaps, of a broad bayou flowing eastward of the main channel, which formerly ran five or six miles to the west of its present course, close under the walls of Borsippa, the site of the mound of Birs Nimrud, identified as the ancient Babel, about 300 miles above the junction of the Euphrates with the Tigris, near the modern village of Hilleh. According to this view it stood on the E. bank of the Euphrates proper, and at such distance from it as to be above reach of its inundation; but the bayou itself, flowing directly through the city, lined with quays, and bordered by great buildings, came to be regarded as the main river. (For the origin and import of the name, see Babel; for the general history of the city, see Assyria, Babylonia, and Chaldea.) Babylon owed its chief greatness to Nebuchadnezzar, who describes it as "the great Babylon that I have built for the house of the kingdom of my power, and for the honor of my majesty." Herodotus, who saw it about 100 years after the death of that monarch, describes it thus: "The city stands on a broad plain, and is an exact square 120 stadia in length each way, so that the entire circuit is 480 stadia. It is surrounded by a broad and deep moat, full of water, behind which rises a wall 50 royal cubits in width and 200 in height (the royal cubit is longer by three fingers' breadth than the common cubit). . . . On the top, along the edges of the wall, they constructed buildings of a single chamber facing one another, leaving between them room for a four-horse chariot to turn. In the circuit of the wall are a hundred gates, all of brass, with brazen lintels and side posts." As 120 stadia are equal to 14 miles, the walls would measure 56 miles, enclosing an area of 196 sq. m. Other writers reduce the circuit of the walls by a fourth, making it 360 stadia. As we learn that within the walls were included gardens and pasture grounds, it is not beyond belief that their circuit may have been as great as represented. But the height given for the walls seems incredible. It is agreed that the royal cubit was equal to 22·4 inches. The height of the walls would then have been 373 ft. 4 in., thickness 93 ft. 4 in. For all purposes of defence a wall of 60 feet is as good as one of any greater height. Strabo and the historians of Alexander reduce the 200 cubits to 50, which has led some to suspect that Herodotus wrote palms instead of cubits. "My own belief," says Sir Henry Rawlinson, "is that the height of the walls of Babylon did not exceed 60 or 70 feet."

Herodotus adds that there was an inner wall of less thickness than the first, but very little inferior to it in strength. Of the circuit



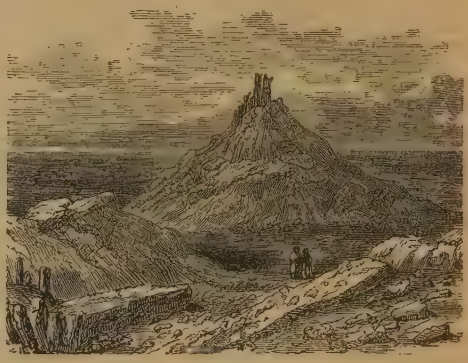
The Kasr.

of this inner wall we are not informed. M. Oppert believes that he has found traces of both walls, and in the plan which he gives it is represented as running parallel to the outer one at a distance of about a mile. Others believe that this was the wall of Nebuchadnezzar's new city, or rather citadel, which had a circuit of five miles. Herodotus also says that "the centre of each division of the town was occupied by the fortress, in one of which stood the palace of the kings, surrounded by a wall of great strength." The ruins of this have been found in one of the three great existing mounds, known as the Kasr. In the other division was "the sacred precinct of Jupiter Belus, a square enclosure of two stadia each way, with gates of solid brass." This has been identified as the ruins now called Babil, a mass of unburned brick rising to the height of 140 feet, which may have been about the height of the original wall. The accounts of different writers may be thus summed up: The Euphrates traversed the city from north to south. From each of the 25 gates on each side ran

Babil, from the West.

a broad street to the opposite gate, dividing the city into 625 squares, each about 2¼ miles in circumference. The river bank on each side was guarded by a wall with gateways at the foot of each street, and steps leading down to the river. The usual means of crossing was by boats; but a single bridge was thrown over. This consisted of stone piers sunk in the bed of the stream, connected by wooden platforms which were removed at night. It is said, but apparently on no good authority, that there was also a tunnel under the bed of the river. The famous hanging gardens do not seem to have attracted the attention of Herodotus. According to other writers, they were built by Nebuchadnezzar to gratify his wife Amyitis, a native of Media, who longed for something in this flat country to remind her of her mountain home. They consisted of an artificial mountain 400 ft. on each side, rising by successive terrraces to a height which overtopped the walls of the city. The terraces themselves were formed of a succession of piers, the tops of which were covered by flat stones 16 ft. long and 4 ft. wide. Upon these were spread beds of matting, then a thick layer of bitumen, covered with sheets of lead. Upon this solid pavement earth was heaped, some of the piles being hollow, so as to afford depth for the roots of the largest trees. Water was drawn from the river to irrigate these gardens, which thus presented to the eye the appearance of a mountain clothed in verdure. Herodotus speaks of writing a special work on the history of Assyria. If this was ever written, it is not now extant. He makes in his general history only a passing reference to the "many sovereigns who had ruled over Babylon, and lent their aid to the building of its walls and the adornment of its temples." He does not even refer to Nebuchadnezzar, whose name was stamped upon the bricks of every important structure. He mentions two queens as having a great share in them. These are Semiramis and Nitocris, of whom the former is a legendary character (See ASSYRIA.) Nitocris seems to have been the daughter of Nebuchadnezzar, and mother of Nabonadius. (See BABYLONIA.) Herodotus affirms that this queen changed the course of the river above Babylon from a straight to a winding course, so that it came several times in view of the village of Ardericca, and a person sailing down the river had to pass three times in as many days in sight of the same spot. Sir Henry Rawlinson says that no such cutting ever could have existed; an assertion corroborated by all attempts which have been made to permanently change the course of a great river flowing through an alluvial region. She also dug an immense reservoir 420 stadia in circuit, facing the interior walls with stone. Into this she turned the river, leaving its bed dry at Babylon, so that she could lay there the piers for the bridge. All this was done to shut out the Medes from intercourse with Babylonia. If such an excavation had existed, it is hardly possible that traces of it should not now remain. In a region where for 100 miles not a pebble is

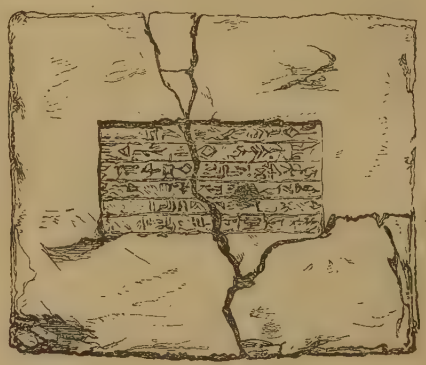
to be found, it is difficult to conceive whence these stones could be brought; and if once brought, it is equally difficult to imagine whither they have been carried. They are not there now, and are not to be found among the ruins of Seleucia or Ctesiphon, built from the fragments of Babylon. A careful comparison of existing facts with the relations of the writers from whom the accounts of Babylon have been drawn will evince that these accounts are greatly exaggerated. Still, there can be no doubt that Babylon as built by Nebuchadnezzar and captured by Cyrus was one of the great cities of the world, though of necessity built mainly of perishable materials. The description given by the great king in his "standard inscription" appears to tell the true story. We quote with abridgments a few passages: "The double enclosure which Nabopolassar, my father, had made, but not completed, I finished. Nabopolassar made its ditch. With two long embankments of brick and mortar he bound its bed. He lined the other side of the Euphrates with brick. He made a bridge over the Euphrates, but did not finish its buttresses. With bricks, burnt as hard as stones, he made a way for the branch of the Shimat to the waters of the Yapur-Shapu, great reservoir of Babylon. I finished the great double wall. With two long embankments of brick and mortar I built the side of its ditch. I strengthened the city. Across the river, to the west, I built the walls of Babylon with brick. The reservoir I filled completely with water. Besides the outer wall, the impregnable fortification, I constructed inside of Babylon a fortification such as no king had ever made before me, namely, a long rampart 4,000 *ammas* (5 miles) square, as an extra defence. Against presumptuous enemies, great waters I made use of abundantly. Their depths were like the depths of the vast ocean. I did not allow the waters to overflow; but the fullness of their floods I caused to flow on, restraining them with a brick embankment. Thus I completely made strong the defences of Babylon. May it stand forever." He describes another structure: "Inside the brick fortifications I made another great fortification of long stones of the size of great mountains. And this building I raised for a wonder; for the defence of the people I constructed it." This is the only case in which stone is mentioned. Not improbably this was the structure spoken of as the hanging gardens. He describes his palace called *Tapratinisi*, "the wonder of the world," which had also been begun by his father. He tells how it used to be flooded by the inundations of the river, and how he raised the platform of brick upon which it stood; and goes on: "I cut off the floods of the water, and the foundations (of the palace) I protected against the water with bricks and mortar. I finished it completely. Long beams I set up to support it. With pillars and beams plated with copper and strengthened with iron I built up its gates. Silver, and gold, and precious stones, whose names were almost unknown, I stored inside, and placed there the treasure-house of my kingdom." Here again there is nothing but brick and mortar and wooden beams; the gates of the palace itself, which Herodotus saw and supposed to be of solid brass, were of wood plated with copper and strengthened with iron. The shapeless Kasr affords no means for testing the accuracy of the description given by Nebuchadnezzar of his palace; but there is a ruin which in a measure affords such a test. This is Birs Nimrud. (See Babel.) The height of this mound, crowned by a tower, was 153 ft., and as it was beyond doubt among the loftiest of the Babylonian structures, we are enabled to rectify the extravagant heights attributed to the city walls.—



Birs Nimrud.

Babylon, at least in its later period, after it had sprung up to be the capital of a great empire, was noted for the luxury and depravity of its inhabitants. "Nothing," says Q. Curtius, "could be more corrupt than its morals, nothing more fitted to excite and allure to immoderate pleasures. The rites of hospitality were polluted by the most shameless lusts." Once at least in her life every woman was obliged to prostitute herself in the temple of Belus. Of the population of Babylon there exists no ground for even probable estimate. As a centre of empire and commerce, its population would be limited only by the capacity for subsistence of the fertile region from which its supplies were drawn. Considering its vast extent, but bearing in mind that only a small portion, probably not more than a tenth, was built over, 1,500,000 is not an improbable conjecture.—The site of the ancient Babel was probably at Borsippa (Birs Nimrud), a little below the later Babylon, and on the opposite side of the main Euphrates. Borsippa was a suburb with separate fortifications, for Nabonadius, after being defeated in the field by Cyrus, threw himself into it, leaving Babylon proper in the charge of his son Belshazzar. For an unknown period Babylon was a town of minor importance, the successive capitals of the Chaldean kingdom lying lower down the plain. Babylon first comes prominently into notice about the time of the

foundation of the dynasty of Nabonassar (747 B.C.). Babylonia having been reconquered by Sennacherib, it became about 680 one of the two capitals of the Assyrian empire, under Esarhaddon, the son of that conqueror. Its great importance dates from the fall of Nineveh, when Nabopolassar made it the capital of the Chaldean empire, and began that great series of fortifications and public works which were completed by his son Nebuchadnezzar (604–561). The last successor of Nebuchadnezzar, Nabonadius, joined the league formed to check the threatening power of Persia. This brought upon him the invasion by Cyrus. Having associated with himself in the government his son Belshazzar, Nabonadius, leaving him in command of Babylon, advanced to meet Cyrus. Being defeated in the field, he threw himself into Borsippa, while Cyrus advanced to the siege of Babylon. The city was provisioned for a long siege and the strength of its walls defied direct assault. It was taken only by the stratagem of diverting the river from its course, and marching in through its dry bed. Herodotus relates that Cyrus turned the Euphrates into the great reservoir excavated by Nitocris. This appears incredible; for even assuming the existence of this reservoir, its waters must have been on a level with those of the river, and no cutting could have laid bare the river bed. Xenophon, a much better authority in this matter, says that Cyrus drained the bed by means of two new cuttings of his own, from a point above the city to another below it. If we suppose that the river was not the Euphrates itself, but a bayou or side branch, shallower than the river, the whole operation becomes perfectly comprehensible. He had only to dam up the mouth of the bayou above the city, and deepen the channel below by which it reëntered the Euphrates. In an hour after cutting away the bulkhead below, the channel would be dry. This was done in the dead of night. It was a complete surprise. So confident were the besieged in the impregnability of their outer defences that they neglected to close the water gates which fronted the river at the foot of each street, and Belshazzar and his court passed the night in revelry. When morning dawned the inner defences had all fallen into the hands of the besiegers (538). Cyrus, having dismantled Babylon, moved upon Borsippa, still held by Nabonadius, who surrendered and received kind treatment. Cyrus assigned him a residence and estate in Caramania, where the last king of Babylon ended his days in peace. For a time Babylon was a royal residence of the Persian kings. Two attempts were made to revolt, and each time Babylon stood a siege and was further dismantled. It ceased to be a royal city; its brick walls and palaces fell into decay; and when Alexander the Great took possession, it was comparatively a ruin. He intended to restore the city, and make it his Asiatic capital, but his death prevented the execution of the scheme. His Syrian successors chose for their capital Seleucia, a few miles to the northeast, on the Tigris. A great part of this city was built with materials carried from Babylon; and when Seleucia fell into decay, from its materials the Parthians built Ctesiphon. Besides these great cities, the Persian Madain, the Cufah of the caliphs, and in a measure the more modern Bagdad, have been successively built from the ruins of Babylon. The place had become a ruin in the time of Strabo (about the beginning of the Christian era). St. Jerome, in the 4th century, learned that it had been converted into a hunting ground for the recreation of the Persian monarch, who in order to preserve the game had partially restored the walls. From that time it passed more and more out of notice, until its very site became forgotten. It is only since 1847 that it has been satisfactorily identified. Its modern representative is the



A Babylonian Brick.

village of Hilleh, with about 7,000 inhabitants. As Birs Nimrud marks the site of Borsippa, the ruins of Babylon proper consist mainly of three mounds: 1. Babil, probably the temple of Belus. This is an oblong mass, 200 yards long, 140 wide, and 140 ft. high. 2. The Kasr, or palace of Nebuchadnezzar. This is an irregular square about 700 yards each way, surmounted with the remains of a square structure, the walls of which are composed of burnt bricks of a pale yellow color, of excellent quality, bound together with a lime cement, and stamped with the name of Nebuchadnezzar. 3. A mound, now called Amran, of an irregular triangular shape, the sides being 1,400, 1,100, and 850 ft. This is supposed to be the ruins of a palace older than Nebuchadnezzar, for bricks have been found there inscribed with the names of more ancient kings. Besides these there are merely fragments of embankments, which may be parts of some of the walls.—For ancient Babylon the principal authorities are Herodotus and Diodorus Siculus; for the history and ruins, Rawlinson's "Herodotus" and "Five Ancient Monarchies," Lenormant and Chevallier's "Ancient

History of the East," Smith's "Ancient History of the East," Loftus's "Chaldæa," and Layard's "Nineveh and Babylon." To these may be added Rich's "Memoirs on the Ruins of Babylon" (1818), and "Narrative of a Journey to England by Bussorah, Bagdad, and the Ruins of Babylon" (1826); Chesney's "Euphrates Expedition" (1850); and Oppert's maps and plans (Paris, 1858).

BABYLONIA, a name applied to the southern part of Mesopotamia in the wider sense, of which Babylon became the capital. Babel, the corresponding Hebrew name, is occasionally used in Scripture in this sense; but the usual term to designate the country and the people is Chasdim, which in the Septuagint and most other versions becomes Chaldea and the Chaldeans. Babylonia included the space between the Euphrates and the Tigris now known as Irak-Arabi (see IRAK-ARABI), together with the strip of territory west of the Euphrates, bordered by the Arabian desert. This country, made wonderfully fertile by an almost unparalleled network of canals, and peopled by Semites, Cushites, and Turanians, was the seat of one of the earliest and most powerful kingdoms of antiquity. (See CHALDEA.) From the establishment of the kingdom down to 625 B. C. the history of Babylonia is chiefly known in connection with its contests with Assyria. (See ASSYRIA.) About that year lower Babylonia rose against Assyria, and was joined by Media. Asshur-bani-pal, the Assyrian king, placed the force in Babylonia under the command of Nabopolassar, apparently a Chaldean. But Nabopolassar entered into a league with Cyaxares the Mede, to whose daughter he married his son, afterward the great Nebuchadnezzar. The Assyrians were defeated by the combined Medes and Babylonians, and Nineveh was destroyed. Babylonia became independent, her boundaries being enlarged on the north by the addition of a few miles between the rivers, on the west by a strip beyond the Euphrates, and on the east by the annexation of Susiana. The greater portion of Assyria fell into the hands of the Medes. For nearly the whole of his reign, which ended in 604, Nabopolassar was occupied in organizing his kingdom. Toward its close Necho, king of Egypt, attempted to extend his dominion to the Euphrates. The Assyrian king sent against him an army under his son Nebuchadnezzar. The Egyptians suffered a total rout at Carchemish on the Euphrates, and the victors took possession of the whole country between the Euphrates and the "river of Egypt"—not the Nile, but a small stream falling into the Mediterranean at El-Arish. Nebuchadnezzar had pursued the beaten enemy to the frontier of Egypt when he received tidings that his father was dead. Intrusting his army, with the captives and spoil, to the command of his lieutenant, to lead them home by the usual circuitous route, he hurried with a small escort straight across the desert. The chief of the Chaldean priests had acted as regent; and when Nebuchadnezzar appeared the crown passed to him without opposition. He reigned 43 years (604–561). With the exception of the period of his seven years' madness, probably near the close of his life, his was among the most glorious reigns in history. Yet, save his name stamped upon innumerable bricks, and the "standard inscription" found among the débris of the temple of Belus, there is not a line of native contemporary history of his reign. The standard inscription speaks only of the great architectural, military, and hydraulic works which he constructed at Babylon. On that series of events which connect him with the history of the Jews, the Bible speaks with considerable minuteness; for the rest we have only a few scattered fragments preserved by the chronographers. Herodotus never names him; and Xenophon had another hero to celebrate. His wars lasted about 35 years, in the course of which he became master of Syria, Judea, Phœnicia, Moab, and Edom, and twice carried his victorious arms into Egypt, far up the Nile, apparently subjugating the country, and placing upon the throne a monarch of his own choosing. But during all this time he was busy in completing the great works at Babylon which his father had commenced. For these his conquests gave him an abundance of such material as could not be supplied by the clay of his own dominion; while his settled policy of dealing with conquered peoples, transporting them in mass to Babylonia, furnished the requisite laborers. He was thus able, without burdening his own people, to carry out his great architectural schemes. The captives were colonized in all parts of Babylonia; forced labor was required of them, and by this the walls of Babylon were raised, the temples and palaces built, the canals and reservoirs excavated, which formed the special glory of the Babylonian monarchy. Making all allowance for the evident exaggeration of later historians, there can be no doubt that Nebuchadnezzar was the greatest building ruler the world has ever seen. Still, from its very nature, his kingdom could not be a lasting one. Literally, as well as metaphorically, its feet were of clay. Its chief military strength lay in its cavalry. The low hot country could furnish no stout infantry capable of withstanding the attacks of the formidable Medo-Persian power which was growing up among the mountains on the east. Nebuchadnezzar must have perceived this; for, in the absence of all natural defences, he set himself to transform his capital into an immense fortified camp, capable of holding a nation, and with walls impregnable to assault. Within three years after the death of Nebuchadnezzar Cyrus revolted against Astyages, and, placing himself at the head of the now formidable Medo-Persian kingdom, began that series of wars in which Babylonia became involved, and which in less than 20 years ended in her overthrow. Nebu-

chadnezzar was succeeded by his son Evil-merodach, of whom but a single act is recorded. He released Jehoiachin, the captive king of Judah, from his imprisonment of 37 years, and treated him with distinguished favor, though still detaining him in Babylon. After a reign of two years Evil-merodach was assassinated by his brother-in-law Neriglissar, who died in less than four years, and was succeeded by his son Laborosoarchod, a mere boy, who in nine months was put to death by a conspiracy formed by his relations. He was succeeded (555) by Nabonadius, the sixth and last king of Babylonia. He appears to have belonged, like Neriglissar, to the priestly order; and it has been conjectured that he was married to Nitocris, a daughter of Nebuchadnezzar, and that she was queen regnant. This conjecture, if admitted, would confirm the statement of Herodotus that many of the defensive works at Babylon, especially designed to repel the Medes, were the work of a queen named Nitocris. It is certain that some of these were constructed during the reign of Nabonadius. If we may assume that his queen was a daughter of the great Nebuchadnezzar, and co-sovereign with her husband, it would be quite natural that tradition should give her the credit for these constructions. Moreover, we are told that Nabonadius was not related to the boy Laborosoarchod, and so could not have been a descendant of Nebuchadnezzar; but in Daniel the queen addresses Belshazzar, the son of Nabonadius, as the son or descendant of Nebuchadnezzar. If now we suppose this queen to have been the queen-mother, and so the wife of Nabonadius, all the accounts are brought into harmony. She speaks also with a kind of authority natural for a mother in addressing her son, but hardly to be expected from a young oriental queen toward her husband. The queen also is especially distinguished from the wives of Belshazzar. At all events, Nabonadius at length perceived the danger which was impending from the direction of Persia. Cyrus was engaged in his war against Crœsus, king of Lydia. Nabonadius joined in the alliance between Lydia and Egypt against Cyrus; but it appears that the Babylonian forces did not arrive in time to take part in the campaign which ended with the overthrow of Crœsus at Sardis. Lydia subjected, Cyrus turned his arms against Babylonia. In 539 the Persian army moved to the Tigris. They wintered on the banks of the Gyndes, and in the spring crossed the Tigris and overran the whole upper country. Nabonadius, leaving his young son Belshazzar in charge of the capital, gave battle under the walls of the city. The Assyrians were defeated, and the king threw himself into the strong fortress of Borsippa, a few miles distant. Cyrus now formally invested the city, and having, after a long siege and bold enterprise (see BABYLON), secured complete possession of it, was about to attack Borsippa; but Nabonadius surrendered without offering any defence. Thus, in 538, the Babylonian kingdom came to an end. The book of Daniel relates that Darius the Mede, son of Ahasuerus, was made king over the realm of the Chaldeans, being then 62 years of age. Attempts have been made to identify this Darius with several princes of Medo-Persia. All these attempts involve insuperable chronological difficulties. Possibly he was a Median nobleman, not elsewhere named, whom Cyrus appointed as viceroy over Babylonia. This seems indeed to be implied by the phrase of Daniel, that "he was made" king. His viceroyalty lasted only two years, being most likely ended by his death; and Cyrus then personally assumed the sovereignty. The captive Jews, who were subject to the direct rule of Darius, naturally spoke of him as king, and usually reckoned the years of Cyrus from the beginning of his personal reign at Babylon, though he had been king of Persia for 20 years. Among the first acts of Cyrus after taking upon himself the government of Babylonia, was to issue an edict permitting such Jews as chose to do so to return to Jerusalem and rebuild the temple. The date of the issue of the edict is one of the epochs which have been fixed upon as the close of the 70 years of captivity. (See BABYLONISH CAPTIVITY.) The overthrow of the Babylonian kingdom marks the period when the empire of the East, so long held by the Semitic stock, passed into the hands of the Aryan race, who retained it for 12 centuries, when it was again wrested from them by the Mohammedan conquest. But for 2,400 years Babylonia has ceased to have any special history of its own, being successively under the sway of the Persians, Greeks, Parthians, Neo-Persians, Saracens, and finally Turks, under whom the country has sunk deeper and deeper into decay.

BABYLONISH CAPTIVITY, the period during which the Jewish people who had been carried away from their country to Babylonia, with their descendants or any part of them, were forcibly detained in a foreign land. It is reckoned as beginning at some point in the reign of Nebuchadnezzar, and ending in the reign of Cyrus or of Darius I. The earliest point thus fixed for the beginning of the captivity is 605 B. C., when Nebuchadnezzar, commanding the forces of his father Nabopolassar, first took Jerusalem; the latest 516, when the building of the second temple was finished. But here is an interval of 89 years, whereas the duration of the captivity is several times stated to have been 70 years. There are two periods of this length, either of which might properly be considered as measuring the captivity. Counting 70 years from 605 B. C., when Daniel was carried off, brings us to 535, or, loosely speaking, to 536, the date of the decree of Cyrus permitting the return of the Jews. This would naturally be the term of the captivity in the mind of Daniel, who re-

fers to the prediction of Jeremiah that 70 years should "accomplish the desolations of Jerusalem." Nebuchadnezzar several times invaded Judea to punish the repeated revolts of his vassals, and at each time carried off considerable numbers, but still did not go to the extent of devastating the country. It was not till the rebellion of Zedekiah, in 588, that he proceeded to the extremity of destroying Jerusalem, burning the temple, and carrying away all except the common people of the country. This wholesale destruction, executed in 586, would seem to be a natural period from which to date the captivity. From this time to that when the temple was reconstructed, 516, is another period of 70 years, covering just the time during which the temple worship and sacrifices were necessarily discontinued.—The indications of the extent of the captivity are not clear; but it seems certain that first and last it included a very considerable portion of the population. The few numbers given seem rather to relate to separate companies of captives. When the decree of Cyrus permitting the return was proclaimed, a company of 42,360, besides 7,337 slaves, at once set out under Zerubbabel; and it is probable that there was a considerable stream of emigration back to Judea. But it is evident that only a small proportion of the Jewish people returned. The temple being reëstablished, the priests would be among the most likely to return; and as out of the 24 courses only four went, it has been conjectured that at least five sixths of the people remained in their new homes. There was little inducement for them to migrate to Judea, an outlying satrapy of a great empire, impoverished by war, and bordered by unfriendly peoples. They had become naturalized in their present homes, where their treatment was mild. In Psalm cxxxvii., where the exiles pour out their griefs, the only complaint as to their treatment in captivity is that they were required to sing their native songs. The burden of their imprecations is against the atrocities committed in actual warfare, and against their former neighbors, the Edomites, who had exulted over the destruction of Jerusalem. They were captives only in name. They were really colonists, not slaves. They had followed the wise advice of Jeremiah, to live peaceably with their neighbors, build houses and dwell in them, and plant gardens and eat of the fruit of them. There was nothing to prevent a Jew from rising to the highest eminence in the state. Daniel occupied an eminent position in Babylon, both under the Chaldeans and the Persians. It is no wonder that with the prudence of their race the majority chose to remain in the prosperous regions where they were born, rather than migrate to the disturbed country whence their fathers had been brought. Before long they were scattered through every province of the Persian empire. We find no instance of hostility to them for more than half a century of Persian rule, when their ancestral enemy Haman succeeded in exciting the suspicions of the vain and jealous Ahasuerus, the Xerxes of classical history. That they had by this time become very numerous is evinced by the loss which their enemies met in the attempt to massacre them. In the capital alone 800 were killed, and in the provinces 75,000. It was not till long after this date, when the Persian empire had fallen into disorder, that any considerable proportion of the Jewish population migrated to Palestine; and even then great numbers went to other countries, where for centuries they were known as "the dispersion."—It is probable that a portion of the descendants of the Israelite captives who had been carried to Assyria more than a century before the first Jewish deportation under Nebuchadnezzar, gradually amalgamated with the captives from Judea, so that the present Hebrews all over the world belong to the twelve tribes, not merely to the two of Judah and Benjamin and the Levites who lived among them. This amalgamation appears to have begun early, for of the 42,000 who went up with Zerubbabel under the decree of Cyrus, about 30,000 are specially noted as belonging to Judah, Benjamin, and Levi, whence it may be fairly inferred that the remaining 12,000 belonged to the other tribes.

BABYROUSSA, or **Babirusa,** an animal of the swine family, peculiar to some of the Malay islands. It is about 3½ ft. long and 2½ ft. high; the legs being longer and the body more slender than in others of the swine species. It does not root in the ground, but lives upon fallen fruits. The tusks of the lower jaw are long and sharp. Those of the upper jaw, instead of growing downward in the usual manner, are reversed, growing upward from bony sockets near the snout, and curving backward until they almost touch the forehead. They sometimes attain the length of 8 or 10 inches, and are found only in the male. Their use is undetermined;

Babyroussa (Sus babirusa).

they cannot be weapons of offence. Some have supposed that they serve to protect the eyes from the spiny plants among which the animal finds its food; but they would for this purpose be equally necessary for the female, which must seek its food in the same way as the

male. From these horn-like tusks, and its comparative lightness of appearance, it derives its Malay name, which signifies the "hog-deer." It is quite as fierce as the wild boar, and an excellent swimmer, often taking to the water for mere pleasure.

BACCARA, or **Baccarat,** a French game of cards, said to have been first introduced into France from Italy at the time of the wars of Charles VIII. Any number of players may participate, and as many packs of cards may be used as necessary. The face cards each count ten, and the others according to the number of their spots. After the bets have been made the banker deals two cards to each of the players, including himself. The aim is to make the numbers 9, 19, 29, or as nearly those as possible, as 8, 18, 28; and any player is at liberty either to "stand" or be "content" with the two cards first dealt, or to call for more at the risk of exceeding 29, when his stake is forfeited to the dealer. If, after the first distribution of two cards to each, any player has a "natural," that is, a sum making 9, or next in value 19, he declares it wins, and the banker pays all who hold superior hands to his own, and claims from those holding inferior. This game has become common in America, where it is played in a slightly different manner, the face cards and tens counting nothing, and the "naturals" being the sums 9 and 8.

BACCARAT, a town of France, in the department of Meurthe, 16 m. by railway S. E. of Lunéville; pop. in 1866, 4,763. It is picturesquely situated at the foot of a steep mountain on the river Meurthe, and is celebrated for its flint-glass manufactory, which employs 1,100 hands, and produces over 3,000,000 francs' worth annually. The manufacture was greatly improved and cheapened by the invention of a bellows for shaping the glass by one of its workmen, Ismaël Robinet, about 1823.

BACCHANALIA, or **Dionysia,** the festivals of the Greek god Bacchus or Dionysus. The most important were held in Attica and Athens, and were four in number. 1. The country or lesser festival was held in all the country districts of Attica, under the superintendence of the demarchs or local magistrates, in the month Poseideon (December), when the vintage was just over. There was a tumultuous procession of men and women, some riding in a cart and casting scurrilous jests and abusive language at the bystanders, and some carrying the phallus, the emblem of the generative power in nature. The phallic hymn was sung, old comedies and tragedies were enacted, the slaves had temporary liberty, large quantities of wine were drunk, and unbounded license prevailed. 2. The wine press festival, or Lenæa, was held in a suburb of Athens in the month Gamelion (January), when the wine was just made and the presses cleaned. This festival, which was celebrated in Asia Minor also, was at Athens under the superintendence of the king-archon, and the expenses were paid by the state. There was a public banquet, a procession, and dramatic entertainments in which new comedies were represented. 3. The flower festival, or Anthesteria, was held at the same place as the Lenæa, in the month Anthesterion (February), and lasted three days. On the first day the vintage was broached and tasted, and persons were initiated into the mysteries of Bacchus. On the second day there were games, and on the third flowers were offered to the god. During the festival the slaves were free, presents were sent to friends, and pupils paid their instructors. 4. The

Bacchanalian Procession.

town or great festival was held at Athens in the month Elaphebolion (March), when the city was filled with strangers from all Greece. The festival was celebrated in the most magnificent manner under the superintendence of the chief archon, at the expense of the state, and consisted of a banquet, a procession, and the acting of tragedies. A prize was awarded for the best play, and, with exceptions in favor of Æschylus, Sophocles, and Euripides, no play which had once won a prize could be repeated. All these festivals were seasons of riotous merriment and drunkenness. In the processions Bacchus himself was represented, attended by delirious women called Lenæ or Bacchantes, who carried thyrsus staffs, cymbals, swords, or serpents, and, made furious by dithyrambic songs, flutes, and wine, danced along in a state of frenzy. Men, covered with skins, masked, and painted to represent fauns and satyrs, accompanied them.—The Romans celebrated the Bacchanalia every third year; but such excesses attend-

ed the secret initiation, which was held by night, and the society became so dangerous, that in 186 B. C. the consuls, by the authority of the senate, issued a proclamation commanding that no Bacchanalia should be held either in Rome or in Italy. After this decree the Liberalia, the festival of Liber, a similar but more moderate rite, was celebrated annually on the 16th of March, and on that day the young men assumed the *toga virilis*.

BACCHANTES, in early antiquity, those women who took part in the secret festivities in honor of Bacchus; subsequently, when males were also admitted, the term was applied to all those initiated into the Bacchanalia. In the slang of mediæval university students, the name was given to those who had not yet completed their first year's studies, and under imposing rites and plausible pretexts were taxed for drinking purposes and initiated in debaucheries by the seniors. Later the name was applied to idle students who led a dissipated life, begging under the pretence of collecting the means for future studies. They were organized into bodies with constitution and rituals, and in many cities public boarding houses were established for them. Sometimes they managed to become teachers, and it was a recommendation for a high school to have many such scholars. For heavy fees in drink they gave instruction in the tricks of their wandering life to younger students, who, under the name of *Tirones*, acted as their servants, stole and begged for them, and were harshly treated. There exist in German two autobiographies of such Bacchantes, Burkard Lingg and Thomas Plater. The reformation stopped these practices; but traces of them lingered in Germany and England down to the 19th century.

BACCHIGLIONE, a river of northern Italy, in Venetia, about 90 m. long, which rises in the Alps, N. W. of Vicenza, flows past that city and Padua, and empties into the lagoon of Venice near Chioggia. Large boats ascend it to Vicenza.

BACCHUS, in classical mythology, the god of wine, known among the Greeks as Dionysus, and often called by the Romans Liber. He was the son of Jupiter and Semele, the daughter of King Cadmus. Juno avenged herself by visiting Semele in disguise, and inducing her to demand of Jupiter that he should appear before her clothed in the attributes of his majesty. No mortal could bear this sight, and Semele was destroyed. Jupiter, however, preserved the still-born child, enclosed him in his own thigh until the proper period for birth, and gave him to the sister of Semele and her husband, and, when Juno persecuted these, to the nymphs, for education. The nymphs brought him up at Nysa in Thrace, where Silenus also assisted in teaching him. Bacchus taught men the cultivation of the vine and the art of wine-making. He collected bands of worshippers, principally women, and surrounded by these, and seated in a chariot drawn by panthers or leopards, he passed through many countries, and even penetrated to India. His followers, maddened with wine and license, and carrying the thyrsus, a hollow wand twined with ivy and vine leaves, attacked those even of their own families who resisted the introduction of the new religion. Pentheus of Thebes was thus killed by his own mother, who was among the Bacchantes.—The Greek legends of the adventures of the god were almost innumerable. He flayed Damascus alive, who opposed him in Syria; visited Lycurgus, king of the Edones, with madness in which he killed his own son; and after the king again became sane, caused him to be torn in pieces by wild horses. He overcame the Amazons. Carried off to sea while he slept by a party of sailors who purposed selling him as a slave in Egypt, he caused the vessel to stand still while vines and ivy grew around the mast and spars, and wine flowed from the deck; then he assumed the form of a lion, and afterward of a bear, killed the captain, and changed the seamen into dolphins, preserving only the pilot, who had warned the crew against molesting the god. The traditions concerning him are very differently given by different authors. Even concerning his birth the legends were contradictory, while the methods of his worship in different countries were widely at variance. He was represented in some works of art as an infant, but generally by the Greeks as a beautiful boy; while in the East he was pictured as a man of middle age and majestic figure, clothed in long robes. His festivals and religious rites, which, originating in Thrace, became wild orgies and scenes of license in Greece and Rome (see BACCHANALIA), and were finally suppressed in the latter city, were probably originally simple ceremonies in honor of the rich and productive power of nature, which he, as god of wine, undoubtedly represented. Among the powers which were attributed to Bacchus were those of prophecy, of healing certain diseases, and of increasing the productiveness of the earth.

BACCHYLIDES, a Greek poet, born at Iulis in the island of Ceos about 512 B. C.; the period of his death is uncertain. He was a nephew of Simonides and a contemporary of Pindar, and passed most of his life at the court of Hiero of Syracuse. Fragments of his works were published by Neue of Berlin in 1822. They are also found in Bergk's *Poetæ Lyrici Græci* (2d ed., Leipsic, 1853). The most recent edition is by Hartung, with a German version (in the *Griechische Lyriker*, 6 vols., 1857).

BACCIO DELLA PORTA. See BARTOLOMMEO.

BACCIOCHI, Napoleone Elisa, a Bonaparte princess, cousin of Napoleon III., only daughter of Elisa, the eldest sister of Napoleon I., princess of Lucca and Piombino, and afterward grand duchess of Tuscany, and of Prince Felice Pasquale Bacciochi, a Corsican nobleman (see BONAPARTE), born in Italy, June 3, 1806, died in her château Kour-el-Ouet, Brittany, Feb. 3 or

4, 1869. In 1825 she married Count Camerata, a wealthy landed proprietor of Ancona. Separating from him in 1830, she resided on her Illyrian domain, engaged in lawsuits for inheritance against her uncles. She devised ineffectual plans for the escape from Schönbrunn of her cousin the duke of Reichstadt, in whose fate she took a profound interest. She spent the latter part of her life in France, and bequeathed the bulk of her fortune to the prince imperial, son of Napoleon III.—Her only son, Napoleone Camerata, killed himself March 3, 1853. Her nephew, Count Felice Baccioochi, born in the early part of this century, died in Paris, Sept. 23, 1866. He inherited the large fortune of his grandfather, prince of Lucca and Piombino. He was the devoted friend and first chamberlain of Napoleon III., superintendent of the theatres of France, and shortly before his death was made a senator.

BACH, the name of a celebrated musical family in Germany. In no department of science, art, or literature has any single family ever achieved such distinction, either from the number of its members who have devoted themselves to the same pursuit, or the talents, genius, and learning which they have manifested in it, as that of Bach in music. Fifty individuals at least of this name, whose lives spread over a period of 2¼ centuries, would deservedly occupy an extended space in an exclusively musical cyclopædia. **I. Veit,** the founder of the German family of the name, was originally a baker by trade, a Protestant in religion, at Presburg in Hungary, whence about the year 1600 he was driven by persecution, with his family, and sought a refuge in one of the small cities of Thuringia. He had received a musical education, and was noted for his skill upon the guitar. **II. Hans** (Johannes), the eldest son of Veit Bach, and the ancestor of most of those of whom mention will be made, was a manufacturer of tapestry and town musician at Wechmar in Gotha. He died in 1626, leaving three sons: Johann, born in 1604, who was appointed organist and director of the city music at Erfurt, which offices he retained from 1635 till his death in 1673; Christoph, born in 1613, died in 1661; and **III. Heinrich,** born at Wechmar in 1615, died at Arnstadt in 1690. He was instructed in music by his father until, needing a teacher of greater knowledge, he was sent to his brother Johann at Erfurt, where in a few years he became a very accomplished organist and musician in the fashion of that epoch. He was employed in these capacities successively by the city authorities of Schweinfurt and Erfurt, until he was called in 1641 to Arnstadt as organist, a place which he filled with great honor till his death.—The Bachs of the next (the fourth) generation were nine in number. **IV. Johann Ægidius,** the second and the most noted of the three sons of Johann, born in 1645, died in 1717. Upon the death of his father he succeeded him as organist and director of the city music at Erfurt. **V. Georg Christoph,** eldest son of Christoph, born in 1642, died in 1697, was cantor and composer at Schweinfurt. **VI. Johann Ambrosius,** brother of the preceding, born in 1645, died in 1695. He was a court and city musician at Eisenach, a sound theorist and of repute in practical music, and was the father of the great Johann Sebastian. **VII. Johann Christoph,** eldest of the two sons of Heinrich, born in 1643, died in 1703. He stands in musical history as one of the very first of German organists, contrapuntists, and composers of his era. He studied music with his father so successfully as at the age of 22 to be called to Eisenach into the service of the court and city, as organist. At the time in which he lived but little music comparatively appeared from the press, and the works of one who lived the retired life of an organist in a small Saxon city could scarcely become known out of his own immediate sphere. His compositions, of which he left a vast number in manuscript, composed for the church and court where he officiated, prove, says Gerber, "that he was truly a great man, as rich in invention as he was strong in the power of musical expression of emotion." A century after his death, at the time when Mozart, Haydn, and Gluck had become models in composition, selections from his works were performed in Hamburg with great success, exciting no small degree of astonishment by their freshness, beauty, and freedom from the trammels of the dry contrapuntal school. So far as the musical taste of his age allowed, his works in general are found to be melodious and truly vocal, at the same time being remarkably full in harmony and very grand in effect. One of his compositions, dated 1684, is a motet in free style, in which, among the (at that time) novelties of construction and harmony, is found the extreme sharp sixth. On the back of the sheet upon which it is written is another piece of sacred music in 22 parts, *obbligato*, the harmonic relations of which to the motet are perfect. The list of his works contains also a motet for St. Michael's day in 22 real parts, a piece of wedding music in 12 parts, another motet for eight voices, instrumented for two choirs and orchestras, a solo for an alto voice with accompaniment for violin, three viols di gamba, and bass, &c. **VIII. Johann Michael,** brother of the preceding, 2d son of Heinrich, was born at Arnstadt about 1660, and became organist and city scribe in one of the Thuringian towns. He was an industrious and effective composer for the church, harpsichord, and organ. One of his vocal works, performed in Berlin a few years ago, surprised every auditor by its beauty and modern coloring. His daughter became the first wife of Johann Sebastian Bach.—The family tree gives 17 Bachs of the next (the fifth) generation, of whom the most distinguished were the following: **IX. Johann Bernard,** eldest son of J. Ægidius, born Nov. 23, 1676, died June 1, 1749. He was organist

of the Merchants' church of his native city, Eisenach, of a church in Magdeburg, and in 1703 successor of Johann Christoph as court and city organist at the former place. He distinguished himself especially in his choral preludes, and by his overtures in Telemann's style. **X. Johann Sebastian,** in some respects the greatest musician that has lived, third and youngest son of Johann Ambrosius, born at Eisenach, March 21, 1685, one month after the birth of Handel at Halle, died at Leipsic, July 30, 1750. At a very early age he lost his mother, and had hardly completed his 10th year when his father died also. The little orphan was then placed under the care of his brother Johann Christoph, organist at Ohrdruff, with whom he continued his musical studies and began the practice of keyed instruments—the harpsichord and organ. His pupilage here was short, being ended by the death of Christoph, which occurred shortly afterward. He then found a place as treble singer in a choir at Lüneburg, not many miles from Hamburg, remaining there until his voice changed, with the advantages of an excellent school and the best musical instruction, and in the receipt of a small stipend, yet sufficient for his boyish necessities. His enthusiasm for the organ and his zeal for music in other forms and styles, at this period, are sufficiently attested by his foot journeys to Hamburg to hear Reinke, the great organist, and to Celle to listen to the French band in the service of the prince. With the change in his voice came the loss of his place and the necessity of entering upon a new field. Like Handel, he had studied the violin, and it was now his resource. At the age of 18 he journeyed to Weimar, and entered the service of the court there as violinist. His leisure hours were still devoted to the organ, to counterpoint, and composition, and in less than two years, though hardly 20 years of age, he was called to Arnstadt to fill the place of organist, probably in the church where his father's uncle Heinrich had so long officiated. The three years spent in Arnstadt were years of most devoted study, and during that time he developed those powers which afterward placed him above all rivalry. Besides the labor which he devoted to the working out of his own conceptions, he let nothing escape him which appeared from the pens of Bruhns, Reinke, and Buxtehude. He was so charmed with the works of the last named that he went to Lübeck to hear him play, and prolonged his visit to a stay of three months, merely to listen to him in the church, for his acquaintance he did not make. In 1707 he accepted a call to Mühlhausen, and the following year returned to Weimar in the capacity of court organist. Encouraged by the continued applause of the court, he exerted himself to the utmost, and his principal compositions for the organ date during the seven years of his service there. In 1714 he became concert master to the duke, with the additional duty of composing and conducting the vocal music of the ducal chapel. Here, doubtless, began the enormous list of works in every form of sacred music, which, mostly in manuscript, are preserved in the musical libraries of Berlin, Leipsic, and other cities. Here, too, he had constant practice in writing orchestral works and instrumental chamber music, and fitted himself for a larger stage of action. In 1717 Marchand, then at the head of French organists, appeared in Dresden, and charmed King Augustus so greatly by his skill as to receive an offer of a very large salary to enter his service. Volumier, also a Frenchman, the concert master of the king, invited Bach to the capital to a trial of skill with Marchand. The Saxon accepted the invitation, and through the kindness of Volumier had an opportunity of hearing his rival. With the knowledge and consent of Augustus, Bach sent his challenge to the French artist, which was accepted. At the time fixed, Bach appeared at the house of the minister where the contest was to take place. The king and company waited long, but Marchand came not. At length came news that he had left the city early that day by extra post. The greatness of the German organist, however, more than made good the loss. Bach returned to Weimar, but soon after accepted the office of kapellmeister to the court at Köthen, where he remained, composing for and directing the orchestra, till 1723, when the city authorities of Leipsic elected him to the position of musical director and cantor of the Thomas school. At the age of 38, then, Bach, rich in all that study of theory, hearing the best models of his age and country, practice as member and leader of orchestras, and constant exercise in composition for church and concert room, could give him, devoted himself to teaching and to the working out of his lofty conceptions of the musical art. Twenty-seven years he thus lived and labored, surrounded by his pupils and his large family of sons, composing music sacred and secular in all the forms then known except the opera and dramatic oratorio, and leaving as the fruits of those years a mass of compositions which, for number, variety, and excellence, form perhaps the most astonishing monument of musical genius and learning. Mozart and Handel alone can at all come in competition with him in this regard. Of the few works from his pen which appeared in his lifetime, most are said to have been engraved upon copper by himself with the assistance of his son Friedemann, and this labor, added to his others so numerous, finally cost him his sight. A few years later, at the age of 65, an attack of apoplexy carried him to the tomb. He was twice married, and left 10 sons, all of them fine musicians, and several of them among the very first of that great period in the history of the art of which Mozart, Haydn, and Gluck were the chief ornaments. This great musician had no cause to complain of a want of due appreciation, either as organist or composer. Very soon after his establishment in Leipsic, the duke of

Weissenfels conferred upon him the title of kapellmeister, with the emoluments of the office, without requiring his personal attendance at court; and in 1736 Augustus of Saxony created him "royal Polish and Saxon electoral court composer." In 1747 he was persuaded to accept an invitation from Frederick II., king of Prussia, to visit Berlin and Potsdam. Notice was given the king of his arrival in the latter city, just as a private concert in the palace was to begin. "Gentlemen," said Frederick, "old Bach has come!" The old organist was instantly sent for, and without affording him time to change his dress, he was brought to the palace. The king had several of Silbermann's pianofortes in various apartments—one may still be seen there—and to these in succession Bach was taken and called upon to try their powers. At length the king gave him a theme for a fugue, which was so wrought out as to afford him the highest gratification, and he immediately afterward demanded an extemporaneous fugue in six parts. Bach thought a moment, and, selecting the theme, worked it up to the astonishment not only of the king but of the several distinguished musicians present. Upon his return to Leipsic he wrote out the fugue, added to it another in three parts, and a *ricercar* also in six, both upon the same theme, together with other specimens of his powers, and published them with the title of "A Musical Offering." The only works by Bach published during his life are exercises for the harpsichord, in three parts, which appeared at intervals; an air with 30 variations; six choral preludes in three parts for the organ; variations in canon upon the choral *Vom Himmel hoch;* and the "Musical Offering." The rest of his works, left in manuscript, have come out one by one, or still remain unprinted. The Bach society at Leipsic, having over 500 members in all parts of the art world, has been engaged since 1850 in publishing a complete collection of his works. Among them are found five complete sets of vocal pieces for the church, for all the Sundays and festivals of the year; a great collection of oratorios, masses, magnificats, sanctus, pieces for birth, wedding, and funeral occasions, and not a few comic compositions; five "passions," so called, compositions to which the accounts of the suffering and death of Christ, as given by the evangelists, furnish the text; more than 100 sacred cantatas are preserved in the library of the Thomas school alone. "The Well-tempered Clavier," a collection of 48 preludes and 48 fugues, is known to every earnest student of the pianoforte, as remarkable in its adaptation to the purpose of enabling the performer to conquer the difficulties of that instrument. His works for organ, harpsichord, orchestra, and every solo instrument in use a century since, are as numerous and effective as his vocal compositions, and begin again to form a part of the programmes in the principal concerts of central Europe. As a virtuoso upon keyed instruments, Bach seems to have anticipated the wonderful effects produced in our own days by Thalberg, and even Liszt. In his own age he was in this regard—as has been said of Shakespeare as a poet—so far above all others as to have no second. The fingering invented by Bach was the basis of his son Emanuel's work upon the pianoforte, which opened a new era for the instrument, and led the way, through Mozart and Clementi, to the extraordinary perfection exhibited by the virtuosos of our own time. To it he was brought by his own works, for, as he himself said, "he had often been compelled to study long at night how to play the compositions which he had written during the day." Perhaps the most striking points in Bach's compositions are the marvellous invention they exhibit, and their extraordinary grandeur, power, and science.

—Of the sixth generation of the Bach family, some 30 in number, the more distinguished were the following: **XI. Johann Ernst,** born at Eisenach, June 28, 1722, died in 1781. He was educated at the Thomas school and the university of Leipsic, made jurisprudence his profession, and settled as an advocate in his native city. But he was a Bach, and music early drew him from the law. At the age of 28 he was made asssistant organist to his father, and finally appointed kapellmeister by the duke at Weimar. Life at court proved disagreeable to him, and upon the death of the duke he returned to Eisenach and to his former position. He was an industrious and successful composer for the church, and while at Weimar produced a great number of orchestral works. Few of his compositions were printed. **XII. Wilhelm Friedemann,** eldest son of Johann Sebastian, born at Weimar in 1710, died in Berlin, July 1, 1784. Of all the Bachs born since Sebastian, this man seemed by nature the best fitted to succeed to the high position which his father held in the art. His genius was of the highest order, and the progress which he made in childhood under his father's instructions gave rise to the brightest hopes for the future. In his early and extraordinary mastery both of the practice and theory of music, he seems to have more nearly rivalled Mozart than any other. His compositions were remarkable for their power and depth, and by his command of the harpsichord and organ in reproducing instantly any musical idea which occurred to him, he aroused the wonder of all who heard him. He studied the violin with the celebrated Graun, afterward concert master to Frederick II. of Prussia, with equal success. He passed through regular courses of instruction at the Thomas school, and then entered the university at Leipsic, where he devoted himself to jurisprudence and mathematics. To the latter science he specially inclined, and retained his fondness for it throughout life. Music, however, was not neglected, and in his 23d year he was called to Dresden as organist in the Sophia church. He remained there till 1747, when he removed to Halle as music director and organist,

where he remained about 20 years, and hence is often named in musical works "the Halle Bach." At the age of 57 he gave up his place, and departed to Leipsic, with nothing certain in view. During the remaining 17 years of his life, without a fixed position, he was a sort of vagabond, teaching and practising music in Brunswick, Göttingen, and Berlin, dying in a miserable condition at the age of 74. This man was recognized by all his contemporaries as the greatest musical genius then living. Unfortunately he was also a man of execrable temper, rude in his manners, almost brutal; possessed of a professional pride which rendered him intolerable to other artists; absent-minded in the highest degree; and a drunkard. During his long residence in Halle he was a constant source of trouble at the church of which he was organist. When on his way thither, he would sometimes forget his errand and wonder why the bells were ringing; sometimes he would enter the church at one door, forget himself, and pass out at the other. He often gave the organ-blower the keys of the instrument in order that, in case of his forgetfulness, some one else might take his place. Sometimes he would forget himself while at the instrument, and play on until the patience of priest and people was alike exhausted. In consequence of a severe reproof upon such an occasion, the now old man gathered up his worldly possessions and went off to Leipsic. The works of Friedemann Bach are few in number, but these few are such as to cause every musician to deplore the sad waste of genius and talent which his life exhibits. **XIII. Karl Philipp Emanuel,** sometimes called the Hamburg Bach, third son of Johann Sebastian, born in Weimar, March 14, 1714, died in Hamburg, Sept. 14, 1788. In his childhood he was thoroughly grounded in music, practical and theoretical, and afterward followed his brother Friedemann to the Thomas school and university in Leipsic. Like him, too, he studied jurisprudence there, and pursued the science further in Frankfort-on-the-Oder. In this city he founded and directed a musical society, which often sang compositions from his pen. At the age of 24 he removed to Berlin, where he lived privately till 1740, when he was appointed chamber musician and accompanist to Frederick II. in that monarch's flute solos. In 1767 he accepted a call to Hamburg as music director. He was one of the most prolific composers of his time, and his works were popular to such a degree, that the list of those published during his life surpasses in extent that of any German composer until the appearance of Joseph Haydn. He was equally great in all departments of composition except the lyric drama, in which he had no call to exert his powers. The choruses of his oratorio "Israel in the Wilderness," and of some of his more extended works for the church, place him nearer Handel, perhaps, in their power, beauty, and ravishing vocal effects, than any other composer. As a writer of songs, odes, and psalms, he surpassed all his contemporaries, and some of his collections reached their 4th and 5th editions soon after their publication. As a symphonist and writer of chamber music he held the first rank. Like the works of Mozart and Beethoven at a later period, his were censured as being full of strange modulations, crudities, and difficulties; but they made their way in spite of the critics, and became the foundation upon which Haydn erected his temple. While restrained within due limits by the example and instructions of his father, he nevertheless made music the medium of expression for the varying emotions of his naturally poetic spirit, and thoughts sublime, pathetic, and humorous are often combined in a manner then utterly new and surprising. Haydn was a most diligent student of his works, and declared in his old age, when he stood in the musical world with no rival but Mozart, "For what I know, I have to thank Karl Philipp Emanuel Bach." Clementi has the reputation of being the father of modern pianoforte playing. That great man, however, acknowledged in Bach his master. He became what he was through his study of Emanuel's works, and to him we owe the publication of many of them. The works of Bach for this instrument, trios, sonatinas with accompaniment, concertos with orchestra, and sonatas, are numbered by hundreds, the motive of which he explained by saying, "In my opinion, the grand object of music is to touch the heart, and this end can never be attained by the pianist by mere noise, drumming, and arpeggios, at all events not by me." His great work upon the pianoforte, the foundation of all the valuable ones which have since appeared, was the *Versuch über die wahre Art das Klavier zu spielen* ("Essay on the true Art of playing the Harpsichord," first part, Berlin, 1759), which reached its third and improved edition before his death; the second part, treating the accompaniment and the free fantasia, was published in 1762. The basis of this work, as may naturally be supposed, was found in the instructions and example of his father. It interprets and renders available the science of Sebastian Bach. **XIV. Johann Christoph Friedrich,** known as the Bückeburg Bach, tenth son of Johann Sebastian, born in Leipsic in 1732, died Jan. 26, 1795. He studied jurisprudence like his brothers above named, and like them also afterward devoted himself to music. He received the appointment of kapellmeister at an early age from the duke of Lippe-Schaumburg, and passed his life in his service at Bückeburg. His compositions were very numerous, especially for the church, no festival being allowed to pass without a new work from his pen. Although neither as a pianist nor as a composer reaching the rank of his two elder brothers, he was worthy of his name, and besides his salary received valuable presents and testimonials from his patrons. His published works consist principally of songs and chamber

music, of which six violin quartets originally appeared in London. **XV. Johann Christian,** known as the Milan or the London Bach, the eleventh son of Johann Sebastian, born in Leipsic in 1735, died in January, 1782. He enjoyed his father's instructions until his 16th year, when upon his death he went to Berlin, to prosecute his musical studies with his brother Emanuel. He bade fair to rival his elder brothers in that style of music which seems to have been in some degree peculiar to the family, and had already produced several smaller compositions successfully, when he was induced, at the age of 19, by some of the Italian vocalists of Berlin, to visit Italy. During a short stay in Milan, he attracted so much attention by his abilities as to be elected one of the organists in the cathedral. But he devoted himself almost exclusively to composition for the voice, and in 1759, upon his appearance in London, had lost much of his previous skill as a virtuoso upon keyed instruments. His style was so much admired, however, that he endeavored to recover his former great skill, but was never able to fully make up the loss his hands had sustained through disuse. In 1763 he was invited to compose an opera for the London stage, and produced *Orione*, which had a most successful run of three months. This was followed by a series of works, some entirely of his composition, others partially so. Many of his airs are admirable, and at the time were exceedingly popular, being always natural, elegant, and in the then best Italian style. He was particularly noted for the richness, variety, and beauty of his accompaniments, which showed the influence of his father and elder brothers upon him, and the profoundness of his theoretical studies. His pianoforte music, however, was in a light and pleasing style, very different from that of any other of his name. Emanuel once reproved him for it, in a letter to which he answered, "I am obliged to use baby talk, that children may understand me." Schubert says of his works: "His church music has great depth, but there is a certain worldly air to it, and one finds therein a sort of taint of corruption. All the operas written by him for Italy, Germany, and England show a master-spirit in the realm of music. This Bach had it in his power to be whatever he would, and he may well be compared to the Proteus of fable. Now he spouts water, now he breathes forth flame. In the midst of the trivialities of fashionable style, the giant spirit of his father may be discovered." His wife, Cæcilia Giassi, was long prima donna in the London opera.

BACH, Alexander, baron, an Austrian statesman, born at Loosdorf, Jan. 4, 1813. He succeeded his father in an extensive law practice, and was at first a liberal; was prominent during and shortly after the revolution of March, 1848, when he was appointed minister of justice, but soon seceded from the revolutionary ranks, and as member of the constituent assembly of that year, and minister of the interior as successor of Count Stadion (1849–'59), he became an uncompromising advocate of the strictest centralizing principles and the most decided opponent of the autonomy of Hungary and other nationalities. He reorganized the judiciary, carried out the emancipation of the peasantry from feudal burdens, which the revolution had decreed, on the principle of indemnity to the owners of land, remodelled the political administration of the crown lands, and promoted the concordat. Detested by the liberals, he left office after the Italian war of 1859, and was minister to Rome till the end of 1865.

BACHARACH, a town of Rhenish Prussia, 26 m. by railway S. by E. of Coblentz, on the left bank of the Rhine; pop. about 1,800. It is surrounded by an old wall flanked with 12 towers, has a ruined Gothic church of St. Werner, and the dilapidated castle of Stahleck, and has long been celebrated for excellent wines, especially muscatel, although the Bacharach wines at the present day do not maintain their ancient repute. In the middle ages the town was with Cologne a chief depot of the wine trade, which is still active. The name is traditionally derived from a rock in the Rhine, called *Bacchi ara* (altar of Bacchus), the exposure of which in very dry weather is regarded as prophetic of a good vintage.

BACHAUMONT, François le Coigneux de, a French writer, born in Paris in 1624, died in 1702. He was a councillor in the parliament of Paris, and acquired celebrity by his satirical publications, in prose and verse, against Mazarin. He was the first to apply the term *frondeurs* (slingers) to the cardinal's adversaries, comparing them to boys throwing stones from slings. When the parliament of Paris became reconciled with Mazarin, Bachaumont sold his councillor's commission. With his intimate friend Chapelle he travelled in southern France, and the witty narrative of the journey, their joint production, was separately published in 1704 and 1732, while other writings of Bachaumont are included in Chapelle's works (1755).

BACHE, Alexander Dallas, an American savant and hydrographer, born in Philadelphia, July 19, 1806, died in Newport, R. I., Feb. 17, 1867. He was the son of Richard Bache and Sophia Burnet Dallas, and a great-grandson of Benjamin Franklin. He attended a classical school in Philadelphia, and in his 15th year was appointed a cadet at West Point, where he graduated with high honors in 1825, becoming a lieutenant of engineers. He was retained for some time at the academy as an assistant professor, and subsequently served two years under Col. Totten in engineering work at Newport, R. I., where he formed the acquaintance of Miss Nancy Clarke Fowler, afterward his wife and his collaborator in astronomical observations. He next filled the chair of natural philosophy and chemistry in the university of Pennsylvania at Philadelphia, and became a member of the newly established Franklin institute.

A full account of his arduous labors in that period for the promotion of mechanical arts is contained in the "Journal" of the institute for 1828–'35. He was associated with Hare, Espy, and other learned men in the American philosophical society, and built a private observatory, where with his assistants he determined, for the first time in the United States, the periods of the daily variations of the magnetic needle, and made other novel and interesting observations. In 1836 he was chosen president of the board of trustees of Girard college, preparatory to organizing that institution, and went to Europe to examine the educational systems of England, France, Prussia, Austria, Switzerland, and Italy. On his return in 1838 he submitted to the trustees a full report, which contributed much to improve the American methods of public instruction. Owing to delays in the opening of the college, he relinquished his salary as president, though retaining this title till 1842. In the meanwhile he organized a system of free education in Philadelphia, at first gratuitously, and subsequently receiving a salary from the city authorities. While engaged in this work he also coöperated with the British association in the determination by contemporaneous observations of the fluctuations of magnetic and meteorological phenomena. In 1842, having completed the organization of the schools, which served as models for many similar institutions, he resumed his former chair in the university. In November, 1843, he was appointed superintendent of the United States coast survey as successor of Mr. Hassler. To this work he imparted a value and efficiency such as it had never possessed before. He was also superintendent of weights and measures, lighthouse commissioner, and afterward member of the lighthouse board, regent of the Smithsonian institution, and a vice president of the United States sanitary commission. The degree of LL. D. was conferred upon him by various universities, and he received medals from foreign governments and institutions. He was successively president of the American philosophical society, of the American association for the advancement of science, and of the national academy of sciences, the establishment of the last two societies having been chiefly promoted by his influence, and he was associated with almost all distinguished scientific bodies in both hemispheres. He bequeathed about $42,000 to the national academy of sciences for the prosecution of researches in physical and natural science, by assisting experimenters and observers in such manner as shall be agreed upon by Professors Henry, Agassiz, and Peirce, or their successors, or by any two of them, these three trustees to constitute a board for the selection of scientific subjects, and for the publication of the observations and experiments, the expense to be defrayed out of the annual income accruing from the legacy, without encroaching on the capital. Among his works are: "Observations at the Magnetic and Meteorological Observatory at the Girard College" (3 vols., 1840–'47); his annual reports on the coast survey and on weights and measures; numerous contributions to periodical publications of scientific societies, including many valuable essays in the "Proceedings of the American Association for the Advancement of Science" (1829–'65); and "Lecture on Switzerland," published from his MS. in the report of the Smithsonian institution for 1870.

BACHE, Benjamin Franklin, an American physician, great-grandson of Benjamin Franklin, born in Monticello, Va., Feb. 7, 1801. He graduated at Princeton college in 1819, and at the medical department of the university of Pennsylvania in 1823; entered the navy as assistant surgeon in 1824, and in 1828 was promoted to be surgeon. While on furlough, from 1838 to 1841, he occupied the professorship of natural sciences and natural religion in Kenyon college, Ohio. He served as fleet surgeon of the Mediterranean squadron 1841–'4, and of the Brazil squadron 1848–'50. He organized and perfected the laboratory at New York whence are supplied all the appurtenances of the medical department, and of which he was director from 1855 to 1871. At the beginning of the civil war in 1861 he rendered important service to the government by rapidly restocking the laboratory on his own responsibility. He was placed on the retired list in 1863, and in 1871 was promoted to be medical director with the relative rank of commodore.

BACHE, Richard, a merchant of Philadelphia, born in England in 1737, died in Berks county, Penn., July 29, 1811. He came to America in early life, and married in 1767 the only daughter of Benjamin Franklin. At the beginning of the revolution he was president of the republican society of Philadelphia, and from 1776 to 1782 he was postmaster general of the United States.

BACHE, Sarah, the only daughter of Benjamin Franklin, and wife of the preceding, born in Philadelphia in September, 1744, died in 1808. In 1780, when many soldiers of the American army were going barefooted and half-clad, money was collected for their relief and expended for materials, which by the continued labors of many women were soon made into the needed garments. In this work Mrs. Bache was prominently engaged. More than 2,200 women were thus employed by her at one time in sewing for the army. The marquis de Chastellux, then visiting in Philadelphia, recommended her to the ladies of Europe as a model of domestic virtues and feminine patriotism. On many occasions she displayed benevolence and patriotism by serving in the hospitals.

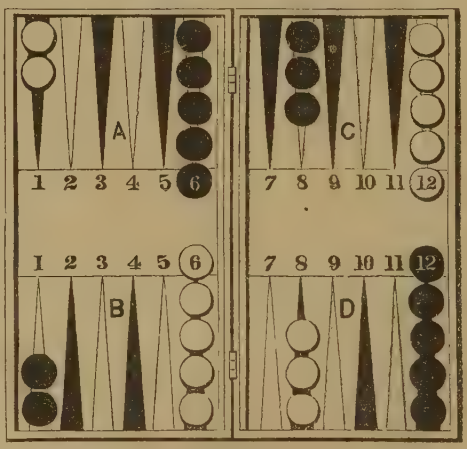
BACHELET, Jean Louis Théodore, a French cyclopædist and historian, born in 1820. He has been professor of history in various colleges, and finally in the lyceum of Rouen. In concert with Ch. Dezobry he edited a *Dictionnaire de biographie et d'histoire* (2 vols., 1857), and

Dictionnaire général des lettres, des beaux arts et des sciences morales et politiques (2 vols., 1862–'3). Among his historical works are: *La guerre de cent ans* (1852), *Mahomet et les Arabes* (1853), and *Les hommes illustres de France* (Rouen, 1867).

BACHMAN, John, an American naturalist and clergyman, born in Dutchess county, N. Y., Feb. 4, 1790. In 1815 he became pastor of the Lutheran church in Charleston, S. C. He was a collaborator of Audubon, and the principal author of the work on the quadrupeds of North America. He has published several other writings, including a "Defence of Luther" (1853), "Characteristics of Genera and Species as applicable to the Doctrine of the Unity of the Human Race" (1854), and essays contributed to the "Medical Journal of South Carolina."

BACK, Sir George, an English navigator, born at Stockport, Nov. 6, 1796. He entered the royal navy in 1808, was for five years a French prisoner of war, subsequently served on the Trent, Lieutenant Commander John Franklin, and accompanied Capt. David Buchan on an expedition to Spitzbergen. In 1819 he accompanied Sir John Franklin's expedition from the western shore of Hudson bay to the northern coast of America, near the Coppermine river. The party reached Fort Enterprise in July, 1820, and determined to winter there, while Mr. Back returned to Fort Chipewyan (a distance of 500 miles), to obtain fresh supplies. He acquitted himself of this duty after undergoing the most terrible hardships from cold and hunger, and rejoined his party in March, 1821. The expedition returned to York Factory in 1822, and early in 1825 Lieut. Back joined Franklin's second expedition, designed to coöperate with Beechey and Parry in their efforts to discover from opposite quarters the northwest passage. He penetrated as far as lat. 70° 24′ N., lon. 149° 37′ W.; and on Franklin's setting out from Great Bear lake, on the return of the expedition, he was left in charge of the remaining officers and men at Fort Franklin. On the breaking up of the ice he started for York Factory, and thence set sail for England, where he arrived in 1827. In 1833 he took charge of the party sent out in search of Sir John Ross, and was exposed to hardships and perils no less appalling than on the previous expeditions. Receiving intelligence of Ross's safety, he returned home in 1835, obtained his post rank, and in June, 1836, took command of the Terror on a fresh Arctic voyage, but without accomplishing anything. He was knighted in 1837, and made rear admiral in 1857. He has published a "Narrative of the Arctic Land Expedition," &c. (London, 1836), and a "Narrative of the Expedition in H. M. ship Terror" (1838).

BACKGAMMON, a game, believed to be of English origin, played with dice and 30 pieces called men, upon a board or table peculiarly divided and marked. Chaucer, Shakespeare, and Bacon mention it under the name of "tables." The name backgammon is supposed by some to be derived from the Anglo-Saxon words *bœc*, back, and *gamone*, a game; by others, from the Welsh *bach*, little, and *cammon*, a battle. The game is played as follows: The men, 15 of which are black and 15 white, in shape like those used in draughts, are arranged, as shown in the cut, on a board each quarter of which is marked with six lines, alternately white and black or red and black. Each of these quarters is called a table; those marked A and B, in which the game begins, are the inner tables, the others the outer. The number of lines across which a player is allowed to move his men is decided by the dice; and the object of the player having the white men, for instance, is to move those of his men which are in his opponent's table (A) through the tables C and D, and finally into his own inner table B; at the same time endeavoring also to bring into that table all his other men, wherever on



Backgammon Board.

the board they may be placed. The player having the black pursues a similar course in moving his men gradually around to his inner table A. Neither player can, no matter what throw he makes with the dice, place his men on a line already occupied by more than one of his opponent's pieces. Should only one of these, however, be found on a line to which he has otherwise the right to move, he can "take up" this solitary man, that is, remove him from the board, and oblige his adversary to begin with him anew in the furthest table from his own inner one. When a player has brought all his men safely into his inner table, he may begin to "throw off" his pieces, that is, remove from the board a man standing on any point the number of which he throws. Should he throw doublets, he may remove four from the point indicated by them. The player who by this means first rids himself of all his men, wins the game. Should he win it before his opponent brings all his men into his inner table, he is said to "gammon" him; if before

the latter even has all the men out of his first table, to "backgammon" him.

BACKHUYSEN, or **Bakhuysen, Ludolf,** a Dutch marine painter, born at Emden in 1631, died in Amsterdam in 1709. While a merchant's clerk in Amsterdam his fondness for shipping led him frequently to the port, where he made admirable drawings. He went out to sea during storms, and on landing immediately transferred his impressions to canvas. The czar Peter frequently visited Backhuysen's studio, and endeavored to make drawings of vessels which the artist had designed. His most celebrated sea picture, with a multitude of vessels, and a view of Amsterdam in the distance, is in the Louvre, together with seven other pictures by him.—His grandson, of the same name, a merchant and soldier, and finally a painter of horses and battles, born Aug. 29, 1717, died in Rotterdam, April 16, 1782.

BACKUS, Isaac, an American Baptist clergyman, born at Norwich, Conn., in 1724, died Nov. 20, 1806. He left the Congregational church for the Separatists, derisively styled "New Lights," a secession from the "standing order" on grounds connected with controversies that grew out of the great revival under Edwards and Whitefield. The Separatists largely sympathized with the Baptists, among whom Mr. Backus became a leader. To his exertions the Baptist denomination in America is largely indebted for its prosperity. He was sent in 1774 as an agent to claim from congress, then in session in Philadelphia, the same liberties for the Baptist that were accorded to other churches. In his writings upon the constitution of the church he advocated the entire separation of the church from the state. He was one of the most voluminous of American Baptist writers, and left a valuable history of that denomination, of which a new edition, edited by the Rev. David Weston, was published in 1871, under the auspices of the "Backus Historical Society."

BACLER D'ALBE, Louis Albert Ghislain, baron de, a French painter, born at St. Pol, Oct. 21, 1762, died at Sèvres, Sept. 12, 1824. He is celebrated for his views of Swiss scenery, remarkable for a knowledge of natural history and topography. He fought at Arcola, and his picture of that battle is regarded as his master-work. He accompanied Napoleon in many campaigns, sketching the movements of the troops. His illustrated works comprise *Souvenirs pittoresques* of Switzerland, of the Italian and Spanish campaigns, and of Paris and its environs. He also painted classical subjects. He was appointed brigadier general in 1813, and subsequently director of the war depots in Paris, but lost this office in 1815.

BACOLOR, a town of the Philippines, capital of the province of Pampanga in the island of Luzon, about 38 m. N. W. of Manila, near the Pampanga river; pop. about 8,500. During the British occupation of Manila (1762–'4) it was the capital of the Philippine Islands.

BACON, Anne, the mother of Lord Bacon, born about 1528, died in 1600. She was the second daughter of Sir Anthony Cooke, tutor of Edward VI., who imparted to her and her three sisters (respectively married to Lord Burleigh, Sir John Russell, and Sir Henry Killigrew) a remarkable degree of classical and theological learning. She prepared excellent translations of Bishop Jewell's *Apologia* and of Ochinus's 14 Italian sermons. Beza dedicated his "Meditations" to her, and she was regarded as one of the most accomplished and pious women of her day. She became the second wife of Sir Nicholas Bacon, to whom she bore two children, Anthony and the celebrated Francis.

BACON, Francis, Viscount St. Albans and Baron Verulam, an English philosopher and lord chancellor, born at York house, in the Strand, London, Jan. 22, 1561, died at Highgate, April 9, 1626. He was the youngest son of Sir Nicholas Bacon. Early in life he gave signs of great fertility of talent. His health was exceedingly delicate, so that he was often affected to fainting by slight atmospheric changes. This constitutional infirmity accompanied him even to his latest days. Nothing is known of the process of his education, except that, as both his parents were learned persons, in the highest walks of life, he must have been early accustomed to study, and he did not miss the lessons of the courtly society by which he was surrounded. When Queen Elizabeth asked him, yet a child, how old he was, he replied, "Two years younger than your majesty's happy reign." In his 11th year he speculated on the laws of the imagination. A year later he was sent to Trinity college, Cambridge, where he was matriculated at the same time with his brother Anthony, June 10, 1573. As a student he was diligent and laborious, but thought for himself, and before he was 16 had already conceived a dislike for the philosophy of Aristotle, still greatly in vogue at the university. "They learn nothing at the universities," he afterward said, in the "Praise of Knowledge," "but to believe. They are like a becalmed ship; they never move but by the wind of other men's breath, and have no oars of their own to steer withal." Some years after he quitted Cambridge he published a tract on the defects of universities, in which, after having premised that colleges were established for the communication of the knowledge of our predecessors, he proposed that a college be appropriated to the discovery of new truth, "to mix, like a living spring, with the stagnant waters." These sentiments he adhered to all his life, for in his will he endowed two lectures, in either of the universities, "by a lecturer, whether stranger or English, provided he is not professed in divinity, law, or physic." And in one of his latest works, the unfinished philosophical romance called "New Atlantis," he developed at considerable length the idea of a college for the "interpreting of nature," under the name of the "college of the six days' works." At the close

of his collegiate course his father sent him to Paris, under the care of Sir Amyas Paulet, the English ambassador at that court, by whom he was shortly after intrusted with a mission to the queen. He then travelled in the French provinces, spending some time at Poitiers, where he prepared a work upon ciphers, and also one upon the state of Europe; but his father dying (1579) while he was engaged upon them, he instantly returned to England. He applied for an office, which he failed to get, when he entered as a student of law in Gray's Inn (1580). On June 27, 1582, he was called to the bar; in 1586 he was made a bencher, and in 1590, when he was but 28, counsel extraordinary to the queen—"a grace," says his biographer Rawley, "scarce known before." At that time the court was divided into two parties, of which one was headed by the two Cecils, and the other by the earl of Leicester, and afterward by his son-in-law, the earl of Essex. Bacon was allied to the Cecils, being a nephew of Lord Burleigh, and first cousin to Sir Robert Cecil, the principal secretary of state; and yet his affections lay with Essex. His advancement, however, did not correspond either with his abilities or his connections. The Cecils represented him as rather a speculative man, not fitted for business. After renewed solicitations they procured for him the reversion of the registrar of the star chamber, with about £1,600 a year, but he did not come into possession of it for 20 years. In 1593 he was returned to parliament as a knight of Middlesex. His first speech there was delivered in favor of his plan for the improvement of the law; another speech related to the postponement of certain subsidies which created popular discontent, whereby he provoked the anger of the queen; and being remonstrated with, he replied that he "spoke in discharge of his conscience and duty to God, to the queen, and to his country"—a noble reply, which he did not himself always in after life remember. Ben Jonson compliments his parliamentary eloquence highly, alleging that "no man ever spake more neatly, more pressly, more weightily, or suffered less emptiness, less idleness in what he uttered; no member of his speech but consisted of its own graces. His hearers could not cough or look aside from him without loss; he commanded when he spoke, and had his judges angry or pleased at his devotion. The fear of every man that heard him was lest he should make an end." In the spring of 1594 the solicitorship became vacant, by the promotion of Sir Edward Coke to the office of attorney general, and Bacon applied for it, strenuously backed by Essex; but he did not succeed, the superior influence of the Cecils being against him. Essex, however, as some compensation for his disappointment, made him a present of Twickenham court, worth about £1,800, and so beautiful that Bacon called it the garden of paradise. It is worthy of remark that Elizabeth rejected the official claims of Bacon on the ground that although he was a man of wit and learning, he was yet "not very deep." During this year Bacon published his first political tract, entitled "A Declaration of the Causes of the Great Troubles," a vindication of the course of England in respect to continental policy. Three years later (1597) he issued a small 12mo called "Essays, Religious Meditations, and a Table of the Colors of Good and Evil." It contained but 10 essays in all, of which he says that he hopes they will be "like the late new halfpence, which, though the pieces are small, the silver is good." Abounding in condensed and practical thought, expressed with much simplicity, and without much imagery, they yet evinced a mind of wonderful sagacity and comprehensive reach. They were translated almost immediately into French, Italian, and Latin, and have proved, as subsequently augmented both in number and length, the most popular of his writings. Dugald Stewart has properly remarked of the book that "it may be read from beginning to end in a few hours, and yet, after the twentieth reading, one seldom fails to remark in it something overlooked before." Dr. Whately published in 1857 a new edition, with an excellent introduction and many valuable notes. By Bacon's contemporaries it was gratefully received.—Bacon's pecuniary affairs at this time were in a wretched state; in order to retrieve them he twice tried to form lucrative matrimonial connections; but these plans also miscarried, and he was twice arrested for debt. Early in 1599 a large body of the Irish, denied the protection of the laws, and hunted like wild beasts by an insolent soldiery, fled the neighborhood of cities, sheltered themselves in their marshes and forests, and grew every day more intractable and dangerous. It became necessary to subdue them, and Essex was appointed lord lieutenant of Ireland; but his conduct in his office was so rash and haughty that Bacon, after vainly remonstrating with him, was at length compelled to turn against him. By this means he lost the aid of that powerful noble, without making either very many or very sincere friends on the other side. His conduct in respect to Essex, who was tried and condemned for his offences in the year 1600, exposed Bacon to the charge of ingratitude and double-faced friendship; and though Mr. Basil Montagu, in his life of Bacon, labored hard, and to some degree justly, to acquit him of the obloquy with which he was then visited, he has scarcely escaped all blame in the judgment of posterity. Bacon not only appeared in the court against the man who had been his benefactor and friend, but, in pursuit of the good will of the queen, he used all his skill as a lawyer to heighten the guilt of his crime. He did not, however, gain much from his fidelity to this sovereign, who either did not discern or wilfully neglected his merits. On the accession of James in 1603 he had everything to expect from the disposition of that monarch, who was a lover of letters, and desired to dis-

tinguish himself as a patron of learning. Bacon possessed the additional title to his favor that his eloquence and information gave him great weight in parliament. Appointed by the house on the committee to make a representation of the misconduct of the royal purveyors, he discharged the task with so much discretion that while he satisfied the king, he won from the house a vote of thanks. James made him one of his counsel, an office to which a small pension was attached, and from that time he continued to rise in spite of the opposition of the Cecils, and the rivalry of Sir Edward Coke, the attorney general. In 1607 he was made solicitor general, by which his practice in Westminster hall was rapidly extended. About the same time he married Alice, daughter of Benedict Barnham, a wealthy alderman of London—thus succeeding in his third attempt at a wealthy marriage. His tact, his knowledge, and his eloquence combined, raised him to the highest point of reputation in the commons, while his standing at the bar was every day confirmed, and his favor at court was increased. But these political and personal struggles did not separate him from those philosophical inquiries which were the first love of his heart. In 1605 he published "The Advancement of Learning" (subsequently expanded into the *De Augmentis*), a work which inaugurated an era in the history of English literature and science. It professed to be a survey of existing knowledge, with a description of the parts of science yet unexplored, and might be regarded as a picture both of the cultivated parts of the intellectual world, and of its outlying, untrodden deserts. This work alone would have been sufficient to place Bacon among the intellectual giants of his race. Yet his active and vigorous mind continued to busy itself with other speculations; besides his many speeches in the commons and his arguments at the bar, he wrote numerous tracts, such as "A Discourse on the Happy Union," "An Advertisement touching the Controversy of the Church of England," and pamphlets upon law reform and other topics of prevalent interest. All the while he was also employed in meditating the great *Novum Organum Scientiarum*, of which sketches were prepared in the shape of his *Cogitata et Visa*, *Filum Labyrinthi*, and *Temporis Partus Maximus*. His lesser writings he undertook, as he says, to secure him a degree of respect and consideration in the general mind, which might afterward serve to conciliate it toward the peculiarity of his opinions, or to answer as a bulwark against unfriendly assaults. In this intention he wrote and sent forth in 1609 "The Wisdom of the Ancients," a book in which the classical fables are made the vehicles of original and striking thoughts, clothed in remarkable beauty of language, and ornamented with graceful figures. Meantime his political advancement went steadily forward. In 1611 he was a joint judge of the knight marshal's court; and the next year he was appointed attorney general, and elected a member of the privy council. While he held the office of attorney general he was engaged in several important causes. He was the prosecutor of Oliver St. John, of Owen and Talbot, and of the old clergyman Peacham, who was indicted for the treason contained in a sermon which was never preached. It is said that he was examined in the Tower under torture, and that Bacon was present assisting at the operation. It is a curious fact that the founder of modern philosophy should have consented to the barbarous system of extorting evidence by the rack. A more important trial was that of the earl and countess of Somerset and their accomplices for the murder of Sir Thomas Overbury, in the conduct of which he earned the highest distinction. The pecuniary embarrassments under which he once suffered were of course now at an end. His professional practice was large; the office of attorney general was worth £6,000 per annum; as registrar of the star chamber he was entitled to £1,600 per annum; his father's seat at Gorhambury had passed to him in consequence of the death of his brother; and he was also possessed of a considerable estate in Hertfordshire, besides the fortune acquired through his wife. In 1616 Bacon relinquished the bar, but retained his chamber practice. In the spring of the following year the lord chancellor, Ellesmere, resigned the seals, which were handed over to Bacon, with the title of lord keeper. In January, 1618, he was created lord high chancellor, and the same year was raised to the peerage as baron of Verulam. His higher title of Viscount St. Albans was not conferred upon him till 1621. Bacon entered upon his judicial duties with elaborate pomp, and delivered a long and eloquent speech in the presence of the judges and the nobility.—The *Novum Organum*, the great restoration of the sciences, which had been the burden of the thoughts of his life, was first printed in October, 1620. Twelve times it had been copied and revised before it assumed the shape in which it was committed to posterity. The full title of Bacon's work was the *Novum Organum sive Indicia Vera de Interpretatione Naturæ, et Regno Hominis*, and the title sums up its principal object. He proposed to replace the scholastic logic represented in the Organon of Aristotle by a new organon, in which the true and solid principle of investigating nature should supplant the old principle of mere verbal dialectics, and lead to "fruit" in the shape of genuine knowledge. It was written in Latin, because it was addressed especially to the learned men of Europe, and in axioms, or short pithy sentences, that it might strike upon their minds by its repetitions, and be easily engraved upon the memory. It is yet, however, but a part of a larger work—of that *Instauratio Magna*—in which he designed to rehabilitate not only the methods of science, but science itself, and of which the *De Augmentis* was an opening

chapter, and the whole of modern discovery the completion. Bacon's leading thought was the good of humanity. He held that study, instead of employing itself in wearisome and sterile speculations, should be engaged in mastering the secrets of nature and life, and in applying them to human use. His method in the attainment of this end was rigid and pure observation, aided by experiment, and fructified by induction. Instead of hypotheses he asked for facts, gathered laboriously from the watch of nature's silent revolutions, or extorted skilfully by instruments and trials, and carried forward by careful generalizations from the world of the known to the unknown. From effects to causes, and not from causes to effects, was the spirit of his recommendations. And that he might not mislead any one by mere general views, Bacon constructed the new logic of observation and induction, and sought to exemplify it in numerous instances. It is in this latter process that he has the least succeeded; but it would be unjust to judge of Bacon's system by its failures. He did not propose to himself in the *Novum Organum* to make discoveries, but simply to cause them to be made, or to teach the art by which they could be made. He compared himself to those statues of Mercury which indicate the way although they do not pass over it themselves, or to a trumpet which sounds the charge while it takes no part in the battle. Yet even in this, the least happy part of his work, Bacon exhibits a fine scientific sense, and anticipates discoveries reserved as the reward of later research. He clearly, for instance, invented a thermometer (l. ii. aph. 13); he instituted ingenious experiments on the compressibility of bodies, and on the density and weight of air; he suggests chemical processes (aph. 48); he suspected the law of universal attraction (aph. 35, 36, and 45), afterward demonstrated by Newton; he foresaw the true explication of the tides (aph. 45, 48), and the cause of colors, which he ascribes to the manner in which bodies, owing to their different texture, reflect the rays of light. Nor did Bacon, as some have wrongly supposed, confine his method to the natural sciences alone; he clearly intended its use in psychological investigations as well; and the metaphysics of the Scotch school are an attempt to render mental science according to his rules. This immense and unprecedented book was received with admiration by a discerning few, but with ridicule and scorn by the would-be wits and geniuses. Bacon's old enemy Coke wrote upon the title page of a presentation copy, having the device of a ship passing the pillars of Hercules,

> "It deserveth not to be read in schools,
> But to be freighted in the ship of fools."

Others said that he wrote of philosophy like a lord chancellor. King James, in his pedantic conceit, compared it to the peace of God, which passeth all understanding. Yet there were some who perceived its truth, among the rest Ben Jonson and Sir Henry Wotton; the latter of whom, addressing him, said, "Your lordship hath done a great and everlasting benefit to all the children of nature, and to nature herself in her uppermost extent of latitude: who never before had so noble and so true an interpreter, never so inward a secretary of her cabinet."—But the glory of Bacon ascended on the eve of a most disgraceful fall. His moral dignity was not on a level with his intellectual penetration. He had a broad, and deep, and vigorous, but not a lofty nature. Giving himself up to improvidence, his need of money betrayed him into practices of corruption. In the house of commons on March 15, 1621, Sir Robert Phillips reported from a committee appointed to inquire into the abuses of courts of justice, two cases of corruption against the lord chancellor. One of these was on a petition of a man named Aubrey, who alleged that he had paid Bacon £100 to advance a suit; and another on that of one Egerton, who had given him a gratuity of £400. Before the close of the proceedings, similar cases to the number of 24 were presented. The commons referred the case to the house of peers, as the only tribunal capable of trying the lord chancellor. Bacon resolved to stand up manfully against his accusers; but, his health giving way, he could only write to the lords. He requested that his case should be conducted according to the strictest rules of justice, to which the lords replied that it should be. His friends he assured in the strongest terms of his innocence. In 14 cases it was shown that the presents were given long after the suits were terminated; in other cases the decrees which he rendered had been against the donors; and in other cases the presents were considered not as gifts but as loans, and he had decided against his creditors. Yet, when brought to the test, Bacon submitted to the accusations. His submission, it is alleged, was brought about by the king, who even persuaded Bacon to sacrifice himself to the popular excitement. On April 22, 1621, he wrote to the lords that he abandoned his defence, and moved them to condemn and censure him. The house required that he should furnish categorical answers to the several articles of charge, which he did, saying to each, "I do plainly and ingenuously confess that I am guilty of corruption, and do renounce all defence," &c. A deputation of the lords being appointed to wait on him, to ask if the confession was his, he said: "It is my act, my hand, my heart. I beseech your lordships, be merciful to a broken reed." His humiliation was complete, and his spirit was crushed within him. He hoped that the king, or his son, or their favorite Buckingham, would interfere to stay the sentence; but they refused. On the 3d of May he was sentenced to a fine of £40,000, and to imprisonment in the Tower during the king's pleasure. He was released from imprisonment after two days, and the fine was subsequently remitted; but his disgrace was

final. Once afterward he was summoned to attend parliament; but he never recovered his standing, and he spent the remainder of his days in scientific studies, and among the few friends whom adversity had left him. His "History of Henry VII.," "Apophthegms," some works on natural history, and a new and enlarged edition of the "Essays" (1625), were all that he published after his fall. The imputations on his honor were doubtless exaggerated by the prejudices of the day, but his own confessions force us to believe that they were well founded, or else that he, in base subserviency to the court, subscribed himself a liar. Mr. Basil Montagu, in his life of Bacon, adopts the latter alternative, and argues against his corruption in favor of his weakness. The practice of receiving gifts was an habitual one; and Bacon probably spoke the truth when he averred that he had been the justest chancellor for many years. He died, saying in his will that "my name and memory I leave to foreign nations and to my own countrymen, after some time be passed over."—Lord Bacon had a capacity no less adapted to grapple with the principles of legal science than to illustrate other departments of knowledge. He lived, however, at a time when the English law consisted mostly of barren precedents, and judges were adverse to any reasoning that had not some analogy to cases already decided. The earliest of his writings on law, which he entitled "Elements of the Common Law of England," consisting of two treatises on "Maxims of the Law and the other Uses of the Law," appears to have been written in 1596. It was dedicated to Queen Elizabeth, but he elicited no encouragement to proceed in the work. The "Maxims" exhibit the same nice discrimination of analogies that was afterward shown in his popular treatise on the "Colors of Good and Evil." Bacon says in the preface that he had collected 300 maxims, but that he thought best first to publish some few, that he might from other men's opinions either receive approbation in his course, or advice for the altering of those which remain. He received neither. The "Maxims" expounded were but 24 in number, and all the residue were by this cold reception lost to the world. Few cases are cited from the books, for which he gives the reason that it will appear to those who are learned in the laws that his instances "are mostly judged cases, or sustained by similitude of reason, but that in some cases he intended to weigh down authorities by evidence of reason, and therein rather to correct the law than either to soothe a received error, or by unprofitable subtlety, which corrupteth the sense of the law, to reconcile contrarieties." It is a common remark that he was not equal to some others, particularly Sir Edward Coke, in applying and reasoning from cases, but it is entirely untrue if by that be meant less discrimination of adjudged cases. On the contrary, no man excelled him in exact judgment of authorities; but often he found these authorities unsupported by just principles, or so conflicting that the rule was to be sought from reasoning, independent of reported cases. Sixteen years later, when he had become attorney general, he again referred to this subject in "A Proposal for Amending the Laws of England," a tract addressed to King James, in which he speaks of the method of expounding the laws upon the plan which he had attempted in his early treatises, as certain to be productive of great advantage, and professes his willingness to resume his labors if desired by the king to do so. The king, however, did not accept the proposal. During the five years that he survived his impeachment and removal from office, Bacon again recurred to this favorite project, or rather he seems never to have laid it aside. A treatise on universal justice, consisting of 97 aphorisms, is contained in the *De Augmentis*, published during that period, which, he says, he wishes "to serve as a specimen of that digest which we propose and have in hand." The digest referred to is explained in an offer addressed to the king about that time. The plan he had in view was somewhat different from that which he had formerly proposed. It was to arrange into some order all the laws, whether statute or common law. The offer met with the same fate as the preceding one. Bacon says, in a letter to Bishop Andrews: "I had a purpose to make a particular digest or recompilement of the laws of mine own nation; yet because it is a work of assistance and that which I cannot master by my own forces and pen, I have laid it aside." Of his other law writings, the "Readings on the Statute of Uses" is the most elaborate. It has now no practical value, in consequence of the change in the laws wrought by time, but it is esteemed by those who have examined it critically a very profound treatise.—Bacon's life has been written by the Rev. William Rawley, who was his secretary and chaplain (London, 1658); by W. Dugdale, in the "Baconiana" of Thomas Tenison (1679); by Robert Stephens (1734); by David Mallet, at the head of an edition of his works (1740); by M. de Vauzelles (Paris, 1833); and by William Hepworth Dixon, "Personal History of Lord Bacon" (London, 1859). The best and most complete edition of his works is that of Spedding, Ellis, and Heath (London, 1857). Basil Montagu's edition (1825–'34) was the occasion of Macaulay's famous essay on Lord Bacon. *Bacon, sa vie et son influence*, by Rémusat (Paris, 1857), is a valuable work. An important monograph on Lord Bacon, entitled *Franz Bacon von Verulam*, by Kuno Fischer, was published in Leipsic in 1856.

BACON, John, an English sculptor, born at Southwark, Nov. 24, 1740, died Aug. 7, 1799. He was apprenticed at an early age to a porcelain manufacturer, in whose employment he learned the art of painting on china, and also of making ornamental figures in that material. At the age of 18 he sent a small

figure of Peace to the society for the encouragement of arts, and received a premium of ten guineas. On nine successive occasions he carried off similar prizes from the society. Bacon was employed at Lambeth to make statues of artificial stone, an art which he did much to develop and render popular. On the opening of the royal academy in 1768 he became one of its students, and the next year gained the first gold medal for sculpture. In 1770 he was chosen an associate of that body. His principal works were two busts of George III.; a monument to the founder of Guy's hospital, Southwark; a monument to Lord Chatham, in Guildhall; a monument to Lord Halifax, in Westminster abbey; the statue of Blackstone in All Souls college, Oxford; a statue of Henry VI. for the ante-chapel at Eton; a recumbent figure of the Thames, in the courtyard of Somerset House; the statues of Howard and Johnson in St. Paul's cathedral; and a second monument of Chatham in Westminster abbey.

BACON, Leonard, D. D., an American clergyman, born in Detroit, Mich., Feb. 19, 1802. He was educated at Yale college and at Andover theological seminary, and in March, 1825, became pastor of the first Congregational church in New Haven, Conn., which position he held till September, 1866, when he withdrew from active pastoral duty. From 1866 to 1871 he was acting professor of revealed theology in Yale college; and since 1871 has been lecturer there on ecclesiastical polity and American church history. From about 1826 to 1838 he was one of the editors of the "Christian Spectator," a religious magazine published at New Haven. In 1843 he aided in establishing the "New Englander," a bi-monthly periodical, with which he is still associated. From 1848 to 1863 he was one of the editors of "The Independent" newspaper of New York. Among his works are: "Life of Richard Baxter" (1830); "Manual for Young Church Members" (1833); "Thirteen Historical Discourses, on the Completion of Two Hundred Years from the Beginning of the First Church in New Haven" (1839); "Slavery Discussed in Occasional Essays from 1833 to 1838" (1846); "Christian Self-Culture" (1863); "Introductory Essay" to Conybeare and Howson's "Life and Epistles of St. Paul" (1868); and many addresses before colleges which have been separately published.—His sister Delia, born in 1811, was eminent as a teacher, and author of "Tales of the Puritans" (1830), "The Bride of Fort Edward" (1839), and "The Philosophy of Shakespeare's Plays" (1857), in which she attempted to show that Francis Bacon was their author. She resided for some time in Stratford-on-Avon, and died in Hartford in August, 1859.

BACON, Nathaniel, commonly called the Virginia rebel, born in London about 1630, died in January, 1677. He emigrated to Virginia in 1675, during the administration of Sir William Berkeley. His abilities as a lawyer, his wealth and popular deportment, gave him great influence. Almost immediately after his arrival he was chosen a member of the governor's council. At that time the colony was distracted by discontents. Gov. Berkeley was highly unpopular on account of his inefficiency in protecting the settlers from Indian ravages, his disposition to restrict the franchise, and the high rate of taxes. When the people took arms ostensibly to repel the savages, but in reality to force the authorities to do their duty, Bacon became the leader of the movement in July, 1676. Berkeley was compelled to make concessions, dismantle the forts, dissolve the old assembly, and issue writs for a new election. But he did not keep faith with the insurgents, and a desultory civil war broke out, in the course of which Jamestown, the capital of the colony, was burned to the ground. In the end the governor was obliged to seek shelter in some English vessels lying in James river, but before Bacon could complete his plans in respect to a new government he died of a disease contracted during one of his Indian campaigns. Soon after his death the rebellion itself was extinguished.

BACON, Sir Nicholas, an English statesman, lord keeper of the seal during the first 20 years of the reign of Queen Elizabeth, born at Chiselhurst, Kent, in 1510, died Feb. 20, 1579. He studied at Corpus Christi, Cambridge, and afterward in Paris. Soon after his return to England he was called to the bar, and in 1537 was appointed solicitor to the court of augmentations. Nine years later Henry VIII. made him attorney to the court of wards, an office in which he continued during the reign of Edward VI. Being a Protestant, he was excluded from favor under Mary; but on the accession of Elizabeth (1558) he was chosen to her privy council, and soon afterward received the great seal, with the rank of lord chancellor. At the public conference held in Westminster abbey in March, 1559, to discuss the doctrines and ceremonies of the church of Rome, he presided. Being suspected in 1564 of having a hand in a book published by one Hales which questioned the title of Mary, queen of Scots, to succeed Elizabeth—a view of the case not then held by the court—he was dismissed from the privy council, and from all participation in public affairs except in the court of chancery. Through the efforts of his brother-in-law Cecil he was afterward restored to favor. He was the father of Sir Francis Bacon.

BACON, Roger, an English Franciscan scholar, born near Ilchester, Somersetshire, in 1214, died at Oxford in 1292 or 1294. At an early age he was sent to Oxford, and thence he went to the university of Paris, then the most famous in Europe, where he took the degree of doctor of theology. About 1240 he returned to Oxford and entered a Franciscan monastery, where he studied Aristotle and all the ancient scholastic philosophy, mathematics, physics, and astronomy, and made many experiments with instruments constructed by himself. The igno-

rance and jealousy of the other monks and of the clergy in general, and hostility created by Bacon's denunciation of their immorality, led to his being accused of studying and practising magic; and his lectures at Oxford were prohibited and the circulation of his writings confined to the convent. Robert Grosseteste, the bishop of Lincoln, befriended Bacon; and in 1265, when Clement IV., who had been a cardinal legate in England, was raised to the papacy, he despatched Raymond de Loudun to the Franciscan monk to procure some of his writings. Bacon sent him the *Opus Majus*, together with two other supplementary works, the *Opus Minus* and the *Opus Tertium*. It is not known what reception Clement gave them, but he had scarcely got them in hand when he died, 1268. For ten years thereafter Bacon was allowed to prosecute his studies in peace; but in 1278 Jerome of Ascoli, superior of the Franciscan order, and afterward pope under the name of Nicholas IV., was appointed legate to the court of France, and was induced to summon Bacon to Paris, where a council of Franciscans condemned his writings and sentenced him to be confined to his cell. He was then in his 64th year, and ten years he passed in confinement. Finally his release was obtained through the influence of prominent persons in England, though some authorities state that he died in prison. Bayle and others reckon 101 of his treatises on various subjects. His chief printed works are: *Perspectiva* (Frankfort, 1614); *Speculum Alchimiæ* (Nuremberg, 1581); *De Secretis Artis et Naturæ Operibus* (Paris, 1542); *De Retardandis Senectutis Accidentibus* (Oxford, 1590); and the *Opus Majus*, edited by Dr. Jebb (London, 1733), which contains a digest of his writings, and is the principal monument of his fame. Manuscripts of his works exist in the Cottonian, Harleian, Bodleian, and Trinity college libraries. A second manuscript of the *Opus Tertium* was found in the library at Douay by Victor Cousin, who gave an account of it, with an elaborate criticism of Bacon and his philosophical character in the *Journal des savants* for 1848. Roger Bacon claims for human reason the right to exercise control over all the doctrines submitted to its approbation; he insists upon the dignity and importance of all the sciences, and establishes experience rather than reasoning as the proper method of research. He fell into many errors on the subject of alchemy and astrology, but his scientific genius was wonderful for his time. His writings anticipate (according to some authorities) the discovery of the telescope; he was acquainted with the composition of gunpowder; and the whole tone of his mind and scope of his thought were two or three centuries in advance of his generation.

BÁCS, or **Bácska,** a county in southern Hungary, surrounded on three sides by the Danube and Theiss; area, 3,972 sq. m.; pop. in 1870, 576,149. The county is mostly level, and, with the exception of a few barren tracts, is noted for its great fertility and splendid pastures. It produces wheat of the best quality, wine, tobacco, and fine cattle and horses. The interior is traversed by the Francis canal, near which Zombor, the capital, is situated. Other important towns are Szabadka or Maria-Theresiopel, on the railroad uniting Zombor with Szegedin, and Neusatz, on the Danube. The population consists chiefly of Magyars, Germans, and Rascians or Serbs. Shortly after the outbreak of the Hungarian revolution in 1848, the county became the principal seat of the Serb rising against the Magyars, and for more than a year witnessed all the horrors of a war of races. After the war it formed with the Banat the Serb waywodeship (Voivodina), but has since been restored to its former status. —**Bács,** a town in the S. W. part of the county, is situated on a small tributary of the Danube; pop. in 1870, 3,666.

BACSÁNYI, János, a Hungarian poet, born at Tapolcza, in the county of Zala, May 11, 1763, died in Linz, Upper Austria, May 12, 1845. His first work was *A magyarok vitézsége* ("The Valor of the Magyars," Pesth, 1785). He coöperated with Kazinczy in editing the *Magyar Museum*, and with him was implicated in the democratic conspiracy of the abbot Martinovich of 1794, and was sent to prison at the Spielberg, where he was confined about two years. Having marrried the German poetess Gabriele Baumberg and settled in Vienna, he was obliged to leave that city in 1809 for translating Napoleon's proclamation to the Hungarians, and took refuge in Paris. He was delivered up to the Austrian authorities after the peace of 1811, and kept under surveillance in Linz. He published his collected poems at Pesth in 1827 and at Buda in 1835.

BACTERIUM, a minute and exceedingly low vegetable form or monad, liable to appear in any fluid or solid substance containing vitalized matters. It is a mere point of organized matter, highly refractive, spherical in form, and moves with considerable activity. The first forms of living organisms, which M. Béchamp called microzymas, have been found in chalk, and are among the smallest living beings that can be seen. They are found also in concentrated alkaline solutions, in all the tissues of organic beings, in various morbid products, in the sugar-producing cells of the liver, in the blood of man and animals, in the liquids of the eggs, larvæ, and perfect form of insects, in the sap of plants, and very extensively, if not universally, in the vegetable and animal kingdoms. They act as powerful organic ferments, as vegetable cells, in the transformation of cane sugar and fecula into glucose. They are derived from the air, in which the germs are in suspension, and undergo various degrees of development before they begin to act as ferments. They undoubtedly play a very important part in both healthy and morbid processes; they assist in the ripening of fruits, in elabo-

rating certain matters for the nourishment of germs, in the constant regeneration of animal and vegetable organs, and in the formation and action of cells. They may, according to Béchamp, develop themselves and grow equally well in an acid, alkaline, or neutral menstruum. The normal microzymas, or organic granules, or molecular granulations, as they are called, in plants and animals, may develop into bacteriums, and many forms of both may exist in the same plant. The inoculation of bacterium in a plant or animal causes their increased number, not by multiplication, but by so modifying the medium that the normal microzymas more readily develop themselves into bacterium. Many of the phenomena of spontaneous generation find their explanation in these all-pervading and minute organisms. According to Bastian, while some of these monads originate by subdivision of preëxisting individuals (homogenesis), others originate *de novo*, just as crystals by certain chemical laws. He thus goes further than those advocates of spontaneous generation who believe that bacteriums originate by transformation of living matter (heterogenesis); for his mode of spontaneous generation he proposes the name of *archebiosis*. Torulæ are very similar bodies, and are the germs of the yeast of fungus. Some bacteriums also may develop into fungi. (See YEAST PLANT.)

BACTRIA, or **Bactriana,** an ancient country of Asia, bounded S. and S. E. by the Paropamisus (Hindoo Koosh) and N. by the Oxus, and corresponding to the modern territories of S. Bokhara, Balkh, and Khoondooz. It was inhabited by a warlike people, akin to the Medes and Persians, and generally regarded as belonging to the original stock of the Aryan or Indo-European races. Zend was the language of the country. Bactra, or Zariaspe, its capital, which occupied the site of the modern Balkh, was the headquarters of the Magi and a centre for the ancient Persian worship. Bactria was in very early times a powerful kingdom, but became a province of Persia about the time of Cyrus. It was conquered by Alexander, who left a colony of 14,000

Bactrian Gold Coin of King Agathocles, B. C. 262–256. (In the Cabinet of France.)

Greeks there, and after his death it formed a part of the dominions of the Seleucidæ. About 255 B. C. its governor, Diodotus or Theodotus, revolted, and it was an independent Greek kingdom, with some dependencies or affiliated realms toward India, from that time till about 126 B. C., when it was conquered by the Parthians. It was overrun by Genghis Khan and Tamerlane in the 13th and 14th centuries. A good deal of light was thrown upon the history of Bactria by the discovery in 1824 by Col. Tod of a large number of ancient coins in the *topes* or burial places of Afghanistan. The names of kings and inscriptions in Greek or Zend are found on these, which have been closely studied by Prinsep, H. H. Wilson, Lassen, and other scholars. They are in the London and Paris museums.

BACZKO, Ludwig von, a German author, born at Lyck, East Prussia, June 8, 1756, died in Königsberg, March 27, 1823. He became blind in his 21st year, from an attack of smallpox, and in 1816 was made superintendent of the blind asylum at Königsberg. Among his works are a history of Prussia in 6 volumes, and a history of the French revolution. He wrote also several romances and dramas.

BADAJOZ. **I.** A province of Spain, in Estremadura, bordering on Portugal; area, 8,687 sq. m.; pop. in 1867, 430,049. It has a diversified surface, broken by several mountain ranges, is well wooded, and includes many alluvial lands of remarkable fertility, though agriculture is backward. The Guadiana traverses the province from E. to W. The climate is hot and unhealthy. There are mines of lead, copper, silver, and quicksilver, and one of gold. Linen, leather, and soap are the principal manufactures. Among the most noted towns, besides the capital, are Merida, Zafra, and the fortresses Albuquerque and Olivença, near the Portuguese frontier. **II.** A fortified town (anc. *Pax Augusta*, corrupted by the Moors to *Paxagousa*, whence Badajoz), capital of the preceding province, and of Estremadura, on the left bank of the Guadiana, 5 m. from the frontier of Portugal, and 203 m. S. W. of Madrid; pop. in 1867, 22,895. It is built on a hill nearly 300 ft. high, crowned with the ruins of a Moorish castle. On the land side the city is protected by a wall flanked with bastions, around which are a moat and outworks, and on the heights beyond several forts. The river is here crossed by a magnificent stone bridge of 28 arches, originally built in the 15th century. There are many Moorish remains, including a mosque. The cathedral was begun by Alfonso the Wise, and contains several paintings by Morales. There were formerly eight monasteries and convents, but the buildings are now occupied for other purposes. Badajoz has manufactories of soap and coarse cloth, and carries on an active trade with Portugal. The frontier position of the town and its strong defences have made it a conspicuous object of attack in the numerous wars in Spain. It was taken from the Moors by Alfonso IX., king of Leon, in 1230. It was besieged by the Portuguese

without success in 1660, and again during the war of the succession in 1705. During the French invasion it was besieged by Kellermann and Victor in 1808 and 1809, and was surrendered to Marshal Soult March 11, 1811, by the treachery of Imaz, commander of the garrison. Beresford made an unsuccessful attempt to recover it, and it was afterward besieged by Wellington, and carried by assault with fearful loss on the night of April 6, 1812. The city was sacked for two days and nights by the British soldiers. Wellington's loss during the 20 days' siege was 5,000, of whom 3,500 fell in the final assault.

BADAKHSHAN, a mountainous country of Central Asia, subject to the Uzbeck chief of Koondooz, situated between lat. 36° and 38° N., and lon. 69° and 73° E., bounded N. by Khokan, E. by the table land of Pamir, S. by Chitral and Kafiristan, and W. by Koondooz; area estimated at 40,000 sq. m.; pop. about 500,000. The country belongs to the basin of the Oxus or Amoo Darya, and is very uneven, with a gradual slope to the west. The principal valleys are those of the Amoo and its tributary the Koksha. The lower valleys and plains are fertile, but the mountains are bare and sterile. The highest central range is the Khoja Mohammed, the peaks of which reach an altitude of 7,000 ft. above the sea, or from 3,000 to 4,000 above the surrounding plains. In the east and south the mountains are higher and more rugged. They are composed largely of limestone, containing lapis lazuli. Rubies are found in crystal deposits. The inhabitants are Tajiks, who speak the Persian language and belong to the Shiah sect of Mohammedans. Badakhshan was a dependency of the Mogul empire, and after its fall paid a doubtful allegiance to Cabool. In 1823 it was reduced by the Uzbecks of Koondooz. Its ancient capital, Fyzabad, and many other cities and towns were destroyed, and the former still lies in ruins. A large part of the people were slaughtered or sold into slavery, and in many fertile districts the population is still very thin. The present capital, Jerm, on the left bank of the Koksha, 105 m. E. of Koondooz, is made up of several scattered hamlets, with about 1,500 inhabitants.

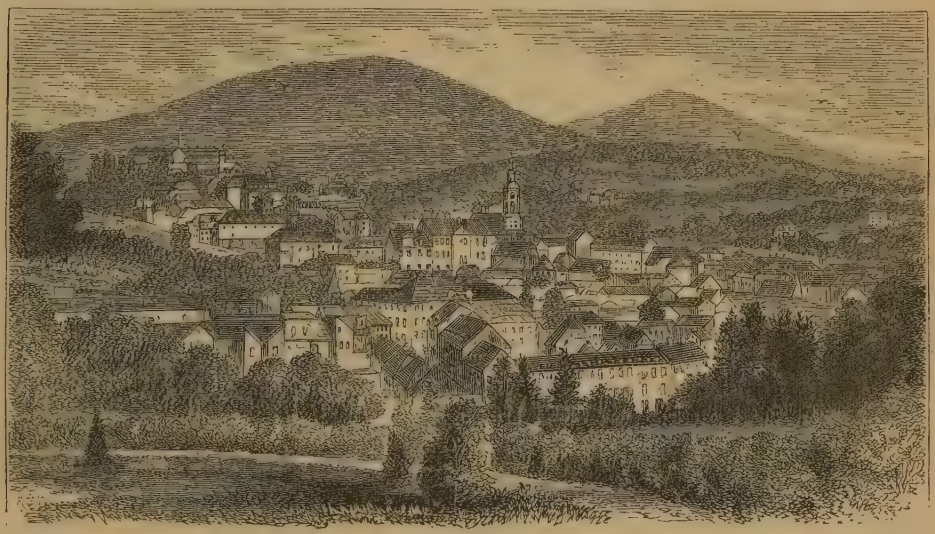
BADEN, a grand duchy of Germany, situated between lat. 47° 30′ and 49° 50′ N., and lon. 7° 30′ and 9° 50′ E., bounded N. by Hesse-Darmstadt and Bavaria, E. by Würtemberg and the Prussian province of Hohenzollern, S. by Switzerland, and W. by Rhenish Bavaria and Alsace; area, 5,910 sq. m.; pop. in 1867, 1,434,970, of whom 931,007 were set down as Catholics, 475,918 Protestants, 2,435 other Christian sects, 25,599 Jews; pop. in 1871, 1,461,428. In 1816 the population was 1,005,899; it increased about 10,000 a year till 1846, after which, owing to emigration, there was a period of decrease till 1855, since which time there has been a gradual increase. The grand duchy is divided into the administrative districts of Constance, Freiburg, Carlsruhe, and Mannheim. The capital is Carlsruhe, which in 1871 had 36,622 inhabitants. The most important commercial city is Mannheim, with 39,614 inhabitants; and the most renowned cities are Heidelberg, the seat of a celebrated university, and Baden-Baden, the famous watering place.—On the western side of Baden, and stretching along the Rhine, is a fertile strip of land, from which the rest of the country rises toward the east. In the southern and eastern parts is the Schwarzwald (Black Forest), extending northward to the Enz, an affluent of the Neckar. North of the latter river is the Odenwald mountain range, connected by ranges of hills with the Schwarzwald, but much less elevated. The highest peaks of the Black Forest are the Feldberg, 4,789 ft., and the Belchen, 4,490 ft. The highest point of the Odenwald, the Katzenbuckel, is about 2,000 ft. high. Between the Rhine and the little river Dreisam is the Kaiserstuhl, an independent volcanic group nearly 10 m. in length and 5 in breadth; the highest point of this group is 1,784 ft.—The principal river is the Rhine, which forms the boundary of the duchy on the south and west. The other most important rivers are the Neckar, Main, and Elz. The Danube rises in Baden, on the extreme east of the Black Forest, under the name of the Brege. Near Donaueschingen it unites with the Brigach, and with another rivulet from the palace yard of Donaueschingen, when it takes the name of Danube. Baden has a number of small mountain lakes, the Mummel, Titti, &c. A part of Lake Constance belongs to Baden.—In the plains and valleys the climate is mild and agreeable, but in the higher parts it is cold and moist, with snow during the greater part of the year, and with frequently very sudden transitions from winter to summer. But on the whole the climate is very salubrious.—In the valleys and plains the soil yields wheat, maize, barley, beans, potatoes, flax, hemp, and tobacco; in the mountainous district, rye, wheat, and oats are cultivated. The extensive vineyards produce excellent wines, and the finest fruits abound. The manufactures are chiefly confined to iron and hardware, and the spinning and weaving of cotton. The Black Forest is distinguished for manufactures of wooden ornaments and toys, watches, wooden clocks, musical boxes, organs, and basket work. St. Blasien is an important seat of ribbon and cotton manufacture. The fabrication of jewelry and of tobacco and cigars occupies the next rank in importance. The chiccory, paper, and cloth manufactures, the tanneries, and breweries are also noticeable. There are extensive government salt works at Dürrheim and Rappenau. The most excellent iron mines are those of Oberwert and Kandern. Gold washing, formerly extensively carried on along the Rhine, is now little practised. Baden has more than 60 mineral springs, the most frequented of which are Baden-Baden, Badenweiler, Antogast, Rippoltsau, and Ueberlingen. The exports are wine, timber, bread-

stuffs, hemp, tobacco, fruits, oil, salt, and manufactured articles. The principal imports are colonial produce, southern fruits, medicines, horses, wool, cotton, silk goods, iron, steel, and various articles of luxury. The currency is the Rhenish, 60 kreutzers to the florin or gulden. The weights and measures are according to the decimal system.—There are two universities, one Protestant at Heidelberg, founded in 1386, and one Catholic at Freiburg, founded in 1457. At Pforzheim is an institution for the deaf and dumb, and at Freiburg one for the blind. The Carlsruhe polytechnic school, established about 1832, is one of the best in Germany. The population of the upper Rhine springs from the Alemanni; along the shores of the Murg and the lower Rhine the Frankish race preponderates; the population along the lake shores are of Suevian (Swabian) and Vindelician origin. The character of the people is marked by honesty, industry, and courage; but the population of the Black Forest is most typical of the ancient German character.—The executive government, besides the grand duke, is composed of six departments, the ministers being responsible to the legislature. The legislative authority is vested in a parliament of two chambers, called the first and second. The first chamber, having 31 members in 1873, consists of the princes of the reigning line, the heads of ten noble families, the proprietors of large hereditary landed estates, the Catholic archbishop of Freiburg, the superintendent of the Protestant church, two deputies of the universities, and eight other members appointed for life by the grand duke; the second chamber of 63 representatives, chosen for eight years, 22 from towns and 41 from rural districts. In 1867–'8 the revenue was 22,824,371 florins, the expenditures 22,834,371, showing a deficit of 10,000 florins, a little more than $4,000. In 1868–'9 there was a deficit of nearly 5,000,000 florins, more than $2,000,000. The estimates for 1870–'71 showed a probable excess of 465,982 florins, something less than $200,000. The general public debt on Jan. 1, 1871, was 37,644,083 florins, and the railway debt 118,015,028. There were 590 m. of railway, 977 m. of telegraph, and 487 sailing and steam vessels engaged in the navigation of the Rhine and the Neckar. Military service is obligatory upon all, the period being three years in active service, four in the reserve, and five in the landwehr; the annual contingent is 4,700 men. The actual force in time of peace is 13,695 men of all arms, besides 568 artillerymen garrisoning the fortress of Rastadt, and in time of war may be raised to 43,705.—The southern portions of Baden are supposed to have been originally peopled by Celts, who were dispossessed by Alemanni. The country subsequently formed a part of the Frankish empire. Berthold, a supposed descendant of the Alemannian dukes, was master of the castle of Zähringen, near Freiburg, and the first duke of Zähringen, in the latter half of the 11th century. His descendants assumed the title of margraves of Baden, but in 1190 the family was split into two branches, Baden and Hochberg, and other divisions took place afterward, as well as various acquisitions by marriage or purchase. Christopher I., who died in 1527, united most of the possessions of the house, but on his death the margraviate was divided between his two surviving sons, who thus formed the two lines of Baden-Baden and Baden-Durlach. The line of Baden-Baden became extinct by the death of Augustus George in 1771, and its possessions were united with Baden-Durlach, under the long and prosperous reign of the margrave Charles Frederick. By the treaty of Lunéville in 1801, Baden acquired a considerable addition of territory, and was further increased in 1803, when the margrave received the title of prince elector, and by the treaty of Presburg in 1805. In 1806, on the dissolution of the German empire, the elector joined the confederation of the Rhine, and, upon occasion of the marriage of the heir apparent with Stéphanie Beauharnais, received from Napoleon the title of grand duke and 1,950 square miles of additional territory; some smaller additions in 1809 and 1810 increased Baden to its present extent. After the battle of Leipsic in 1813 the grand duchy returned to the German confederation. It then formed a territory of about 5,800 sq. m., with a population of something more than 1,000,000. The public debt was large, and the taxes burdensome; and moreover a strong desire had grown up among the people for a constitutional government. This led to earnest discussions in the chambers, and to some administrative reforms. The revolutionary movements of 1830 produced little effect upon Baden; but after the proclamation of the French republic in 1848 a revolution broke out in Baden, which was soon suppressed. (See Hecker.) In May, 1849, a new revolution expelled the grand duke, set up a provisional government, and was only overcome in July by aid of the armed force of Prussia. (See Rastadt.) In 1852 the grand duke died, and there arose a question as to the succession, which was further complicated by a dispute between the civil power and the Catholic archbishop of Freiburg. The question of succession was finally disposed of, the grand duke Frederick William Louis assuming the authority. He married in 1856 the daughter of the king of Prussia, now emperor of Germany. On the division between North and South Germany in 1866, Baden was forced by its geographical position to side with South Germany, although its sympathies were with Prussia. At the close of 1870 it was incorporated with the German empire. The troops of Baden form the largest part of the 14th German army corps.

BADEN. I. A town (anc. *Aquæ Pannoniæ*) of Lower Austria, on the river Schwechat, 14 m. S. S. W. of Vienna; pop. in 1869, 10,433. It is a favorite summer resort as a bathing place, having 13 hot sulphur springs. The

town has also dye works, and steel, brass, furniture, and other manufactories. **II.** A town of Switzerland, in the canton of Aargau, on the Limmat, 13 m. N. E. of Aarau; pop. about 3,000. Its hot sulphur springs were well known to the Romans, who built a castle upon the site where the city now stands. The hottest and most celebrated of the springs is called Verenabad. The rocky heights on each side of the river form a portal through which the Limmat runs. Before the gorge was formed, the country above must have been a considerable lake. The railway passes by a tunnel 800 feet long under the castle hill. Baden from the 15th to the beginning of the 18th century was the seat of the Swiss diet. In the town house of Baden Eugene of Savoy, who acted as representative of the emperor of Austria, signed the final treaty of peace terminating the war of the Spanish succession, Sept. 7, 1714.

BADEN-BADEN, a German watering place, in the grand duchy of Baden, situated on the Oos, at the foot of the Black Forest, 18 m. S. S. W. of Carlsruhe; permanent pop. in 1871, 10,083. There are nearly 30 hot springs, flowing from the rock at the foot of the castle terrace. The waters vary in temperature from 115° to 154° F., and are carried in pipes to the different baths throughout the town. A pint of water from the Ursprung, one of the hottest and most copious of the springs, weighs 7,392 grains, and contains 23·3 grains of solid matter, 16 of which consist of common salt, 6½ of sulphate, muriate, and carbonate of lime, and the remainder of a small portion of magnesia, traces of iron, and about half a cubic inch of carbonic acid gas. The number of visitors to the baths has of late been about 50,000 a year, the season being at its height in July and August. There are numerous hotels and several public baths. The principal place of resort for visitors is the *Conversationshaus*, which is surrounded by pleasure grounds and contains an assembly room, restaurant, library and reading room, and the formerly so celebrated gaming tables, the licenses of which expired in 1872, and have not been renewed. The drives and promenades about the town are beautiful. There is a parish church containing the remains of the margraves of Baden, who resided here for several centuries, an English church built in 1867, and a Greek chapel. The remains of Roman vapor baths have been discovered just beneath the new castle. The picturesque ruins of the old castle of the margraves still crown the summit of the Schlossberg, and the new castle, the summer residence of the grand duke, stands lower down on the hill directly overlooking the town. It was founded in 1471, burned by the French in 1688, and subsequently restored. Beneath are curious dungeons connected with the old Roman baths, and in the upper part are portraits of the Baden family.



Baden-Baden.

BADEN-BADEN, Ludwig Wilhelm I., margrave of, a German general, born in Paris, April 8, 1655, died at Rastadt, Jan. 4, 1707. Louis XIV. was his godfather. He served first under Montecuculi against Turenne, and then under the duke of Lorraine. At the siege of Vienna by the Turks, in 1683, he threw his forces into the city, and by a brilliant sally effected a junction with King Sobieski and the duke of Lorraine, who had come to its relief. In 1689 he defeated the Turks at Nissa, and in 1691 at Salankamen. He also took an active part in the war against France in 1693, and after the death of Sobieski in 1696 aspired to the crown of Poland; but the elector of Saxony was preferred to him. He again commanded in the

campaign of 1702, in the war of the Spanish succession, and took Landau, but was subsequently defeated by Villars at Friedlingen and at Höchstädt. He built the famous lines of Stollhofen from the Black Forest through Bühl and Stollhofen to the Rhine.

BADGER (*meles*, Cuv.), a carnivorous plantigrade quadruped of the order *mammalia*, originally classified with the bears, raccoons, and coatis by Linnæus, but separated by more recent naturalists. The badgers have 4 false molars in the upper and 8 in the under jaw, 2 and 4 on each side respectively, followed by a carnassier and a single tuberculous tooth of large size. They are the least carnivorous of the family to which they belong, with the single exception of the bears. They have 5 toes, before and behind, deeply buried in the flesh, and provided with powerful, compressed claws, adapted for burrowing in the earth, or digging for roots, which are their principal food. The body is long, flat, and compressed; the head small and flat, with an elongated snout; the legs sturdy and powerful; the tail short. Below the anus there is a slit, from which exudes a very fetid oleaginous matter, similar in character, though not in odor, to that of the civets and genets. The badgers are inoffensive, timid, nocturnal animals, sleeping during the day in their burrows, which are curiously constructed, with a single entrance, but with many different chambers within, terminating in a circular apartment, well lined with dry grass or hay, in which the male dwells alone, eschewing the company even of his female. The badger is a very cleanly animal, carefully removing everything that might become offensive from his dwelling, never depositing his excrements near its entrance, and instantly evacuating it in case of its being polluted by any other animal. The flesh is in some places much esteemed as an article of food, and it is usually very fat. The badger makes a vigorous defence when attacked; and as its bite is terrible, it requires a brave and powerful terrier dog to drag it from its burrow.—The geographical distribution of the badger extends over the whole of Europe, northern and central Asia, and the northern parts of North America. It does not extend into Africa or South America, in the former of which continents it is represented by the rattel (*gulo mellivora*), as it is in the latter by the various kinds of moufette (*mephitis*). In Australia there exists no plantigrade animal of any kind. In the eastern peninsula and the Indian isles the place of the badger is supplied by the telagon (*mydaus meliceps*). This genus contains at the most only three species, and some writers have reduced it to a single one, asserting that the American badger is a mere variety of the European, and the Indian a distinct genus; for neither of which opinions does there appear to be any foundation. 1. The common badger of Europe (*M. vulgaris* or *taxus*) is about the size of a moderately large dog, but longer and fatter in the body, and lower on the legs. The head is long and pointed, the ears so short as to be concealed by the fur. The tail barely reaches to the mid-thigh. The hair is long and coarse,

Badger (Meles vulgaris).

except that on the belly and breast, which is short and resembles fur. The head is white, with a black chin and two black bands passing backward from the corners of the mouth, including the ears and eyes, and meeting at the nape. Every hair of the upper part of the badger has three distinct colors, yellowish white at the roots, black at the middle, and ash-gray at the top, which gives a uniform sandy gray color to all its upper parts. The throat, breast, belly, and limbs are jet black. The female badger produces three, four, or five young in the early spring, suckles them for about five weeks, and then gradually accustoms them to shift for themselves. When taken early the young cubs are easily domesticated. Badgers are hunted in some parts of England by moonlight, principally for their hides, which, when properly dressed, are held to make the best pistol furniture. Their hair is of great value for shaving brushes and for paint brushes. The hind quarters, when salted, are good eating, but are not much in use in England. In China badgers' hams are a choice dainty. 2. The American badger (*M. Labradorica*) measures about $2\frac{1}{2}$ feet from the snout to the origin of the tail, which extends to

American Badger (Meles Labradorica).

6 inches more. Its head is less attenuated than that of the European species, though equally elongated. The claws of its fore feet are much

longer; its tail is shorter, its fur of a much softer and more silky character, and its colors different. It frequents the sandy plains skirting the foot of the Rocky mountains, so far north as the Peace river, and abounds in the country watered by the Missouri; but its southern and western limits have not been defined. It is a far more carnivorous animal than its European congener, and is also believed to hibernate during the winter months, which habit is not common in either of the other species. It preys on the marmots of the plains, the *spermophilus Hoodii* and *Richardsonii*, and on all the smaller quadrupeds, as field mice and the like, and also feeds on vegetable matters. It extends into Mexico, where it is called *illacoyotl* or *coyotlhumuli;* and very fine specimens have been sent from California. 3. The Indian badger, balisaur, or sand bear (*M.* or *arctonyx collaris*), is about the size of the European badger, but stands much higher on its legs, and is distinguished by its attenuated muzzle, its truncated snout resembling that of a hog, and its short tail. Its body somewhat resembles that

Indian Badger (Meles collaris).

of the bear; and when attacked it sits erect like that animal, and seems to possess a similar power in its arms and claws, which are truly formidable. In color and the nature of its fur it closely resembles the European species. The markings of the head are exactly like those of the English badger, but its throat is white, and the black bands from the muzzle to the ear, instead of meeting at the nape, encircle the white of the throat, forming a distinct gorget.

BADIA Y LEBLICH, Domingo, a Spanish traveller, known as Ali Bey, born in 1776, died near Aleppo in 1818. He learned Arabic at Valencia and London, and under the name of Ali Bey and in the disguise of a Mussulman spent two years (1803–'5) in Morocco on terms of high favor with the emperor. He then made a pilgrimage to Mecca, stopping some time in Tripoli, Cyprus, and Egypt, afterward visiting Jerusalem and prominent places in Syria, and reaching Constantinople in the autumn of 1807. He was there for the first time suspected of not being a real Mussulman. He fled, and returning home in 1809 entered the public service under King Joseph Bonaparte, on whose expulsion he was forced to leave the country. He published an account of his travels at Paris in 1814, under the title *Voyages d'Ali Bei en Afrique et en Asie pendant les années* 1803 *à* 1807, in which he described places and things which no Christian before him had seen. Four years later he set out on a second journey to the East, but died soon after his arrival in Syria.

BADIUS, Jodocus, or **Josse,** a Flemish printer and author, born at Assche (whence he was surnamed Ascensius) near Brussels in 1462, died in 1535. He was well educated, especially in Latin and Greek, which he taught for 12 years at Lyons, working at the same time as a printer. Early in the 16th century he founded in Paris his famous printing establishment, the *Prelum Ascensianum*, from which issued some of the most famous editions of classic authors. He was himself the author of various translations and annotations, of a life of Thomas à Kempis, of a satire on women entitled *Naviculæ Stultarum Mulierum*, and other works, in prose and verse. He was the father-in-law of Robert Stephens.—His son Conrad succeeded him in the printing business, removed to Geneva in 1549, and died about 1565. He wrote *Satires chrétiennes de la cuisine papale* in French verse.

BAENA (anc. *Castra Viniana*), a town of Spain, in the province and 34 m. S. E. of the city of Cordova; pop. about 11,600. Grain and oil are the chief articles of trade, and are exported to Malaga. The site of the old Roman town is still distinguishable.

BAER, Karl Ernst von, a Russian naturalist, born in Esthonia, Feb. 12, 1792. He studied at Dorpat and Würzburg, and in 1819 became professor of zoölogy in the university of Königsberg, where he organized the zoölogical museum. In 1834 he was called to St. Petersburg to become the librarian of the academy and one of its most prominent members. In 1837, by order of the czar, he conducted scientific explorations on the northern shores of Russia and made valuable descriptions of the plants and animals. He has written numerous treatises upon zoölogy and botany, especially those of northern Russia.

BAERLE, Gaspard van (Lat. *Barlæus*), a Dutch poet, theologian, and historian, born in Antwerp, Feb. 12, 1584, died in Amsterdam, Jan. 14, 1648. He studied theology at Leyden, and in 1617 was elected professor of logic there. He adopted the principles and wrote in defence of Arminius and the Remonstrants, for which he was at length deprived of his professorship. He then studied medicine and obtained a doctor's degree from Caen, but remained at Leyden, supporting himself by

giving private instruction, till 1631, when he was elected professor of philosophy and rhetoric in the newly founded athenæum at Amsterdam. He was one of the best Latin poets of that period, and has left records of the government of Count Maurice of Nassau in Brazil, and of the reception given to Maria de' Medici at Amsterdam in 1638.

BAEZ, Buenaventura, president of the Dominican republic, born at Azua, Santo Domingo, early in this century. He inherited a large fortune from his father, a mulatto, who was prominent in the revolution of 1808; coöperated with Santana in the establishment of Dominican independence; and was president from 1849 till 1853, when he was supplanted by Santana, who expelled him from the country. After the deposition of Santana in May, 1856, Baez, who had spent the interval in New York, resumed the presidency, Oct. 6, 1856; but he was once more ousted by Santana June 11, 1858, and obliged to remain abroad till after the evacuation of Dominica by the Spaniards in 1865, and in December of that year he was elected for a third presidential term. This was interrupted in March, 1866, by an insurrection led by Gen. Pimentel in favor of Cabral, in consequence of which Baez was banished to St. Thomas. A new revolution in December, 1867, drove Cabral from power and restored Baez. After various direct and indirect negotiations, he signed on Nov. 29, 1869, two treaties with President Grant, one for the cession of the bay of Samana and the other for the annexation of the Dominican republic to the United States, subject to the approval of the people of the republic, which was ostensibly obtained in an election (decreed by Baez Feb. 16, 1870) held under the protection of American men-of-war. The United States senate, however, refused to ratify the treaty. A commission was appointed by President Grant, under authority of congress, to visit and examine the island, and reported in April, 1871, in favor of annexation; but the measure was pressed no further. Its failure encouraged Cabral and Pimentel to renew the civil war.

BAEZA (anc. *Beatia*), a city of Spain, in the province and 23 m. N. E. of the city of Jaen, 3 m. N. of the Guadalquivir; pop. 13,400. It has a cathedral and several fine public edifices, of which the most noteworthy are the university, the oratory of St. Philip Neri, the marble fountain with caryatides in the plaza, and the arch of Baeza. In the days when it was held by the Moors, it had a population of 50,000, was surrounded by a strong double wall, and contained the residence of several Moorish kings. The sculptor Gaspar Becerra was born here in 1520. The trade and manufactures are inconsiderable.

BAFFIN, William, an English navigator, born in 1584, died in 1622. In 1612 he accompanied James Hall on his fourth arctic expedition, and on his return wrote an account of it, in which a method is laid down for the first time of determining the longitude at sea by an observation of the celestial bodies. In 1613 he explored the coast of Greenland, and wrote a narrative of his voyage. In 1615 Baffin accompanied Robert Bylot as mate on a voyage to the northwest in the Discovery. In the following year he again sailed with Bylot, and on this occasion discovered the bay which has since borne his name. Baffin published an account of both voyages, and gave a very accurate description of the bay. He afterward made voyages to the East, and in 1621 joined an English expedition to the Persian gulf, which united with the Persians to expel the Portuguese, and was killed at Ormuz.

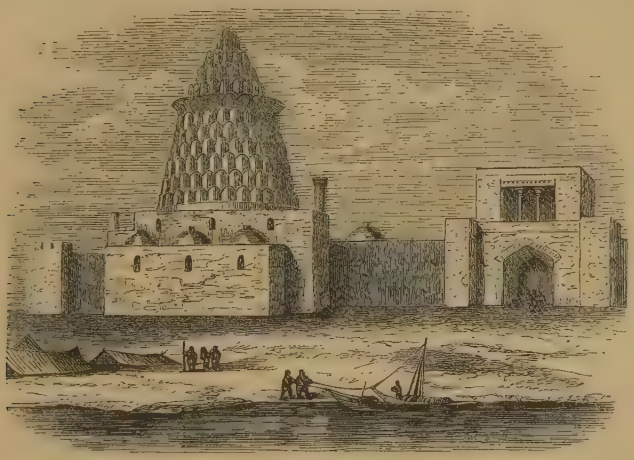
BAFFIN (or **BYLOT**) **BAY,** an extensive gulf or inland sea on the N. E. coast of North America, communicating with the Atlantic by Davis strait, and with the Arctic ocean by Smith sound to the north, and Lancaster sound to the west. It extends about 800 m. from S. E. to N. W., has an average width of 280 m., and is included between the parallels of 68° and 78° N., and the meridians of 50° and 80° W. It was named in honor of William Baffin. It was visited by Capt. Ross in 1818, by Capt. Parry in 1819, by Inglefield in 1852, who established the existence of a channel connecting it with the great polar sea, and by McClure in 1850–'53, who was the first to sail from Behring strait to Baffin bay. The coasts are rocky and precipitous, rising in many places to the height of 1,000 feet, and presenting a vast number of lofty peaks of very singular shape. Innumerable sounds and creeks open on each side of the bay. Black whales of large size, seals, and walrus are captured here, and bears and black foxes and various sea fowl are found on the shores. The depth of water, as far as ascertained, varies from 200 to 1,050 fathoms.

BAFFO, called the Pure, a Venetian woman of remarkable talent and beauty, who was captured in 1580 by corsairs while on the way with her father from Venice to Corfu, and carried to Constantinople, where she became the slave and afterward the sultana of Amurath III., over whom she exercised extraordinary influence. Amurath subjected the female attendants of Baffo to the torture in order to extract from them the secret of her fascination; but as they could confess nothing, the legitimacy of the sultana's influence was no longer questioned. After the death of the sultan she became adviser of her son Mohammed III., and her influence did not wane till 1603, when her grandson Ahmed consigned her to the old seraglio, where she died.

BAGAUDÆ, or **Bagaudi,** a body of Gallic peasants who revolted against the oppression of the Romans about A. D. 270, headed by one Victoria, called by the soldiers Mother of Legions. They besieged and took Augustodunum (Autun), and utterly destroyed what was previously a flourishing metropolis. Claudius temporarily quelled them, and Aurelian remitted their

taxes, and granted them a general amnesty. Under Diocletian, in 294, they rose again, and Diocletian, himself engaged in putting down the Persians and the barbarians of the lower Danube, sent Maximian against them. They rallied under two leaders, Ælianus and Amandus, who assumed the title of emperor. The coins of these Bagaudian emperors are still extant, and bear pagan inscriptions, although they were reputed to be Christians. Maximian soon compelled the Bagaudæ to capitulate. The two emperors fell in battle. The place of this sanguinary contest was long known as the *Fosses des Bagaudes*. The Bagaudæ long continued to be troublesome, and infested the forests and fastnesses of Gaul with an irregular kind of brigandage until the end of the western empire.

BAGDAD, a city of Asiatic Turkey, situated on both sides of the river Tigris, here about 700 feet wide, in lat. 33° 20′ N., lon. 44° 25′ E.; population estimated at about 100,000, of whom about 15,000 were Jews, 3,000 native Christians, and the remainder Mohammedan Arabs, Kurds, Turks, and Persians. Bagdad is unequally divided by the river Tigris, two thirds being on the left bank, and the remainder on the right, and the two divisions are connected by two bridges of boats. The town is fortified on one side by a high brick parapet wall, flanked at intervals with high-bastioned towers and surrounded by a wide fosse. The citadel is situated on the N. W. extremity. A large suburb, enclosed by ramparts to resist the attacks of the Arabs, is on the other side. The houses in Bagdad, like those of other oriental towns, present on the exterior either dead walls or ruins, and the streets are narrow, winding, and unpaved. The interiors of the houses of the wealthier classes are comfortable in an eastern sense, and compare favorably with those of Damascus and other cities. There are several mosques ornamented with glazed tiles of various colors, and crowned with domes. There are Syriac, Chaldee, Armenian, and Roman Catholic churches, and several Jewish synagogues. A new Jewish school was established in 1872 by the *alliance israélite universelle*. A large general hospital has recently been erected. The bazaar built by Daoud Pasha is one of the finest in the East, and well stocked with home and foreign manufactures. The view of the city from the river presents a pleasant spectacle, the luxuriant date groves and orange gardens forming an agreeable contrast with the domes and minarets. In summer the heat is intense, and sometimes the thermometer for several days ranges between 110° and 120° F. Five miles below Bagdad the Saklavieh or Isa canal brings during the season of the floods a portion of the waters of the Euphrates into the Tigris. The commercial importance of this city has greatly declined, though during the last 25 years its decay has been somewhat checked. Large rafts supported by 200 or 300 inflated skins are much used for the transportation of goods. Fleets of boats of from 40 to 70 tons burden ascend and descend the river with cargoes to and from the Persian gulf, and caravans carry goods in different directions from this great emporium. The products of the region round Bagdad are tobacco, timbac (a plant used as a substitute for tobacco), maize, wheat, barley, cotton, rice, fine wool, goats' hair, gall nuts, and yellow berries. The fruits are grapes, melons, apricots, quinces, figs, cherries, pomegranates, oranges, lemons, citrons, pears, and dates. Wild asses abound on the plains. Besides the above-mentioned articles, the city exports also horses, pearls, coral, honey, raw silk, bitumen, naphtha, saltpetre, and salt. The imports from Asiatic Turkey and Europe are soap, silks, woollen cloths, prints, opium, and copper; from Arabia, raisins, gum, coffee, and drugs. The revenue derived from the tax on transit goods is estimated at $3,500,000. An English company has projected a railway from Bagdad to the Mediterranean, by way of Aleppo. Bagdad is the seat of a Turkish vali or governor general, whose vilayet contains an area of about 10,000 sq. m., comprehending parts of Kurdistan and Khuzistan, most of Al-Jezireh, and Irak-Arabi.



Ezekiel's Tomb.

—The city was built by the caliph Al-Mansour as his capital, 762–'6, and called Medinat el-Salem, "City of Peace." It was a favorite residence of the Abbasside caliphs, was beautified by Haroun al-Rashid, and under his son Al-Mamoun became the great seat of Arabian literature and learning. In 873 the city was

said to have 2,000,000 inhabitants. It was conquered in 1258 by Hulaku, the grandson of Genghis Khan, and by Tamerlane in 1401, by the Persians and Turks successively in the 15th century, by the Persians again in 1623, and by the Turks finally in 1638. It suffered severely from plague in 1831, and from famine in 1870–'71.

BAGE, Robert, an English novelist, born at Derby in 1728, died at Tamworth in 1801. He was a paper-maker, in which trade he continued for the greater part of his life. His principal works are "Mount Heneth," "Barham Downs," "The Fair Syrian," and "James Wallace." Sir Walter Scott recommended that he should be included in Ballantyne's "Novelist's Library," and wrote his life for that work.

BAGGESEN, Jens Immanuel, a Danish poet, born at Korsör in Seeland, Feb. 15, 1764, died in Hamburg, Oct. 3, 1826. He was educated at Copenhagen, and gained considerable reputation while still young by his comic tales and a collection of odes and songs. The most remarkable of his writings is his *Labyrinthen*, a species of autobiography. He wrote many lyrical poems in German—a language which he used with the same facility as his native tongue. A collection of these appeared at Hamburg in 1803, and at Amsterdam in 1808. His best German work is his poem *Parthenais*, of which a French translation appeared in 1810. He was appointed professor of the Danish language at Kiel in 1811. A few years later he returned to Denmark, but finally left his native country in 1820. A new edition of his Danish writings appeared in 1845, in 12 volumes, at Copenhagen. A collection of his German writings was also made in 1836.

BAGHERIA, or **Bagaria,** a town of Sicily, in the province and 9 m. E. S. E. of Palermo, on the railroad from Palermo to Termini; pop. 13,200. Near it are numerous villas of the nobility.

BAGHIRMI, a kingdom of central Africa, S. E. of Lake Tchad, between the Bornoo and Wadai countries, bounded W. by the Shari river and its affluents; greatest length from N. to S., about 240 m.; greatest breadth, 150 m.; pop., inclusive of the pagan dependencies in the outlying S. E. provinces, about 1,500,000, chiefly negroes, and nominally Mohammedans, though there are still many remains of pagan rites. The country is principally a plain, nearly 1,000 feet above the sea, there being no mountains excepting in the extreme north and in the outlying S. and S. E. provinces. The capital is Masenya, in lat. 11° 38′ N., lon. 16° E. The army consists of 10,000 infantry and 3,000 cavalry. The chief products are millet, sorghum, sesamum, beans, ground nuts, a kind of grass called *jojo*, rice, cotton, and indigo. Wheat is raised only for the private use of the sultan. The principal trees are the tamarind and the deleb palm. The climate is extremely hot. There are no mines. The horses are fine, and the Shouwa Arabs wandering between Baghirmi and Lake Tchad have large flocks of sheep and cattle. The people (Bagarmi) are superior in appearance and character to other central African tribes, and the women are among the finest in Negroland; but the men are cruel in warfare and castrate their prisoners.—Baghirmi became an independent kingdom in the 16th century, and was afterward converted to Mohammedanism. In 1815, after a long war, it became tributary to Bornoo and Wadai. The title of the ruler is *banga* (sultan). Dr. Barth (1852) was the first European to visit the country.

BAGNÈRES, the name of two bathing towns of S. W. France, in the Pyrenees, both known to the Romans, though under what names is uncertain. **I. Bagnères-de-Bigorre,** in the department of Hautes-Pyrénées, capital of an arrondissement, on the left bank of the Adour, at the entrance of the valley of Campan, 13 m. S. of Tarbes; pop. in 1866, 9,433. Its warm and hot mineral springs, more than 40 in number, attract numerous invalids and pleasure-seekers. It has manufactories of baréges. **II. Bagnères-de-Luchon,** in the department of Haute-Garonne, 18 m. S. E. of the preceding; pop. in 1866, 3,921. It lies at the foot of the Pyrenees, in the beautiful valley of Luchon, about 5 m. from the Spanish frontier. It has hot and cold mineral springs, and is surrounded by fine scenery. In the neighborhood are copper mines and slate quarries.

BAGNOLES, a hamlet of France, in the department of Orne, in a valley 13 m. S. S. E. of Domfront. This village, celebrated for its baths and mineral springs, was built in the 17th century, but has been in later times much improved and adorned with fine buildings and promenades.

BAGOAS, a eunuch in the service of Artaxerxes Ochus of Persia, who, though a native of Egypt, aided the king in the reconquest of that country. He was, however, so much displeased by the sacrilege of the king to the sacred animals and other objects of worship in Egypt that, after his return to Persia, he poisoned him, and raised Arses, his youngest son, to the throne, having murdered all the others. Soon becoming offended with the new king also, he destroyed him and made Darius Codomannus king (336 B. C.). He afterward attempted to poison Darius, but was detected and poisoned himself. He is supposed to be identical with the Bagoses mentioned by Josephus, who led the troops of Artaxerxes Ochus to Judea, seized the temple, and compelled every Jew to pay a tribute of 50 shekels for each lamb sacrificed.

BAGOT, Sir **Charles,** a British diplomatist, born at Blithfield, Sept. 23, 1781, died at Kingston in Canada, May 18, 1843. He was the second son of William, first Lord Bagot. In 1807 he was appointed under-secretary of state for foreign affairs; in 1814 was sent on a special mission to France; in 1820 was ambassador at St. Petersburg, and in 1824 in Holland. On the death of Lord Sydenham in 1841 he

was made governor general of the Canadas, which office he held till his death.

BAGPIPE, a wind instrument of great antiquity, which seems to have been a favorite with many nations of Europe in the dawn of musical taste, but is so identified at the present day with the Scotch Highlanders as to be considered almost peculiar to them. Its invention is traced back to the mythical age of Greece, while among the Romans the instrument, almost identical in form with that now in use, was familiarly known as the *tibia utricularis.* It was also known to many of the Scandinavian tribes, and was probably introduced into Ireland and Scotland by the Danes and Norwegians at a very early period. The instrument consists of a leather bag, inflated through a valved tube by the mouth or a bellows, connected with which is a flute part called the chanter, perforated with holes, and furnished with a reed, the action of the air from the bellows upon which produces the music. Three pipes or drones, two of which are in unison with D on the chanter, while the third, or great drone, is an octave lower, complete the instrument. The rude construction and limited compass of the bagpipe render it available for the performance only of tunes consisting of a few notes, and all set on the same key. As it is ignored by educated musicians, we find but little music written for it, and the pipers play almost entirely by ear. It is said that schools exist in some of the Scottish islands for instruction on the bagpipe, and the Highland society of Edinburgh offer annual premiums for the sake of encouraging the art.

BAGRADAS. See MEJERDA.

BAGRATIDES, or **Bagradites,** a royal family of Armenia and Georgia, whose founder was Bagrat or Bagrad, according to tradition the descendants of a Jewish exile of the time of Nebuchadnezzar, who were allowed by Valarsaces, first king of Armenia of Parthian race, about 149 B. C., the privilege of putting the crown upon the head of the Armenian monarchs. About A. D. 300 the family adopted Christianity, and in the 5th and 6th centuries resisted the efforts of the Neo-Persians to bring the Armenians back to the religion of Zoroaster. The Byzantine emperors and afterward the caliphs of Bagdad conferred the dignity of governor of Armenia upon several of the Bagratides. The Bagratide Ashod or Ashot, in the latter half of the 9th century, first assumed the title of shah-in-shah or prince of princes, and subsequently the kingly crown, on the condition of rendering a small tribute. This dynasty reigned in Armenia till 1079, frequently sharing the supremacy with princes of other houses. Another Ashod had ascended the throne of Georgia about 790, and his son Bagrad firmly established the family on it in 841. This dynasty maintained its independence till the occupation of Georgia by the Russians at the beginning of this century.

BAGRATION, Peter, prince, a Russian general of the Georgian Bagratide family, born about 1765, died Oct. 7, 1812. He entered the Russian army as a common soldier, and first served in the wars against the mountaineers of the Caucasus; then under Suvaroff against the Turks in 1788, when he took part in the storming of Otchakov, and against the Poles in 1794. Under the same general he fought with distinction against the French in Italy and Switzerland (1799). In 1805, under Kutuzoff, he commanded the vanguard in the Austro-Russian campaign; at Znaim he successfully resisted Murat and Lannes, whose forces outnumbered his. Having been created a lieutenant general, he commanded the vanguard of the Austrian army at Austerlitz, under Prince Lichtenstein. In the Prussian campaign of 1807, his resistance made the battle of Eylau so terrible that even Napoleon shuddered at its bloody results. With equal stubbornness he fought at Friedland. In 1808 he overran Finland, and occupied the Aland isles; and in 1809 he commanded against the Turks, and besieged Silistria, though without final success. In 1812 he fought an unsuccessful battle with Davoust at Mohilev, but succeeded nevertheless in joining the Russian main army. He was mortally wounded at the terrible battle of Mozhaïsk or Borodino, Sept. 7, 1812, just a month before he died. He married in 1810 a lady of great beauty and wealth descended from Catharine I. At the congress of Vienna she was one of the leaders of fashion and gallantry, and subsequently lived in Paris in grand style. In 1830 she married secretly Col. Caradoc, afterward known as Lord Howden, from whom she soon separated herself. She died in 1856.

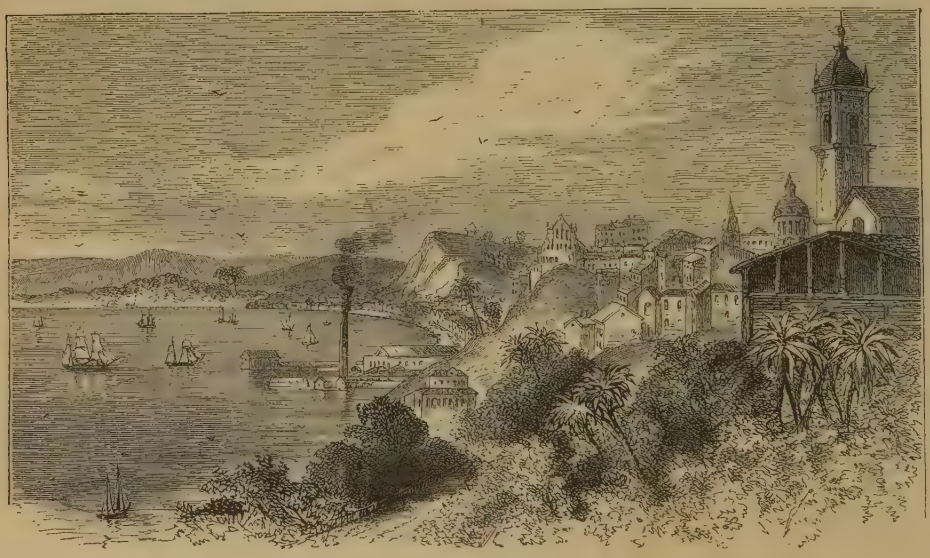
BAGUL, or **Baghul,** a small state in N. W. India, on the S. bank of the Sutlej, in lat. 31° N., lon. 77° E.; area about 100 sq. m.; pop. about 40,000. The surface is generally mountainous, with two summits, Bahadurghar and Bara Devi, 6,233 and 7,003 ft. above the sea. The revenue of the state is only £5,000, but it maintains an army of 3,000 men.

BAHAMAS, a chain of islands belonging to Great Britain, extending N. W. and S. E. between the N. coast of Santo Domingo and the E. coast of Florida, and lying between lat. 21° and 27° 30′ N., and lon. 70° 30′ and 79° 5′ W. They are about 600 in number, of which only about 15 are inhabited, a great many of them being merely small rocky islets. The most important of them are Grand Bahama, Great and Little Abaco, Andros, New Providence, Eleuthera, San Salvador, Rum Cay, Great Exuma, Watling Island, Long Island, Crooked Island, Atwood's Key, and Great and Little Inagua. The group is about 600 m. long, and has an estimated area of upward of 3,000 sq. m.; pop. in 1871, 39,162. Most of the islands of the group are situated on the Bahama banks. They are generally very flat, long and narrow, formed of calcareous rock, with a light, sandy soil; though without running streams, there are numerous springs. Fruit is produced in abundance. Maize, yams, sweet potatoes, oranges,

limes, lemons, &c., are among the products of the islands; there are also several valuable woods, as mahogany, fustic, lignum vitæ, &c. In the more southerly islands are large salt ponds. The principal exports are salt, sponge, pineapples, and oranges. The climate is salubrious, and very beneficial to consumptives. The imports in 1869 amounted to £240,584, and the exports to £163,002. The government is administered by a governor, aided by an executive council of 9 members. There is a legislative council of 9 members and a representative council of 28 members. The capital is Nassau, on the island of New Providence, which during the civil war in the United States was a famous place of resort for blockade-runners. The commercial activity by which it was then characterized has since fallen away.—San Salvador, called Guanahani by the natives, was the first land discovered by Columbus in 1492. The Bahamas were then inhabited by an inoffensive race, whom the Spaniards carried away and forced to labor in the mines of Santo Domingo and the pearl fisheries of Cumana. They then remained unoccupied till 1629, when the English settled them. These were dispossessed by the Spaniards in 1641, and the islands repeatedly changed masters until they were annexed permanently to the British empire by the treaty of 1783. At the close of the American revolutionary war many of the royalists settled in the Bahamas.

BAHAWALPOOR. See Bhawlpore.

BAHIA (Port. and Span., bay). **I.** A province of Brazil, bounded E. by the Atlantic, N. W. and N. by Pernambuco and Sergipe, W. by Goyaz, and S. by Minas Geraes and Espiritu Santo; area, about 200,000 sq. m.; pop. in 1867, estimated at 1,400,000, including nearly 300,000 slaves. It is traversed



Bahia.

from S. W. to N. E. by a mountain range having various local names and sending forth lateral offshoots. The magnificent primeval forests are disappearing before the increasing cultivation of the soil, though many of them, especially in the Berra-Mar region, noted for their wealth of timber, still remain. The mountainous regions are the least fertile, owing to excessive dryness. The principal river is the São Francisco, which forms the N. and N. W. boundary, and has a rather fertile valley; but the most productive region of Bahia and the most densely populated of Brazil is the country along the coast, called the Reconcavo, with many villages, farm houses, plantations, and over 20 small towns. The province is rich in palm trees of prodigious size; in cashew, nayha, and gum-yielding trees; in medicinal plants, and in manioc, fruits, and vegetables. Minerals abound, but are not worked. The discovery of diamond fields by a slave in 1844, in the Serra Sincura, led to a great influx of population. Bahia exports more sugar than all the rest of Brazil. It is famous for its tobacco and for the increasing production of cotton, rivalling that of Pernambuco. The rice is of superior quality; the Brazil wood equals that of Pernambuco, but the coffee is inferior to that of Rio. It was one of the first of the Brazilian provinces peopled by Europeans, and the aborigines, who chiefly inhabit the mountains, are more rapidly declining here than in any other part of the empire. **II. Bahia,** or **San Salvador,** capital of the preceding province and of a district of the same name, situated on All Saints' bay (Bahia de Todos os Santos), about 800 m. N. E. of Rio de Janeiro, in lat. 13° S., lon. 38° 30′ W.; pop. over

150,000, composed about equally of whites, blacks, and mixed races. Among the whites are many foreign merchants, especially from Hamburg and Bremen. The bay from which the city and province derive their name is one of the finest in the world, being 37 m. long from N. to S., and 27 m. wide from E. to W., with two entrances from the south, on either side of the island of Itaparica, and a depth of water varying from 8 to 40 fathoms. The bay contains several small islands, and is defended by a few forts. The city is situated on the E. shore, near the entrance and just inside Cape São Antonio. It is built partly on the shore, but chiefly on high ground. The lower town is dirty and has very narrow streets. The houses are chiefly of stone, and some of them five stories high. In the Praya, the great business street, which runs 4 m. along the wharves, are the church of the Conception, built of stone imported from Europe, the exchange, the warehouses, the arsenal, and ship yards. The number of churches and religious houses exceeds 60. The archbishop of Bahia is primate of Brazil. In the upper town, which is well paved and has pleasant streets and a number of handsome residences, constructed with balconies and blinds in place of windows, is the most renowned Brazilian cathedral (formerly the Jesuit church), built of European marble and containing pictures of Loyola and St. Francis Xavier. The ancient Jesuit college has become a military and medical school. There is a large ecclesiastical seminary, an extensive library, and a theatre. Among other public buildings of the upper town are several hospitals (partly supported by lotteries), and the palaces of the governor and the archbishop. In the wooded promenade, laid out on an abrupt promontory, is an obelisk in honor of John VI. The exports include sugar, cotton, coffee, tobacco, nuts, cacao, hides, horns, rum, piassara, tapioca, dyewoods, and rosewood. The value of diamonds exported is estimated at $3,000,000 annually. The imports are cotton goods, woollen and linen cloths, fish, flour, provisions, hardware, wine, copper and iron, soap, coals, and other articles. Estimated value of exports, $8,000,000; value of imports, nearly $10,000,000. The importations from England, which formerly constituted the greatest part of the import trade, have lately declined, and the trade with the German ports is also less active than formerly. About 400 British vessels enter and leave the port annually, and the shipping of all nations includes nearly 800 vessels. The commerce with the United States in the nine months ending June 30, 1870, included 61 inward and outward vessels, with cargoes of an aggregate value of about $400,000. The coasting trade is exclusively carried on by Brazilian vessels.—The bay was discovered in 1503 by Americus Vespucius, and the city was founded in 1510 by the Portuguese navigator Correa, who called it San Salvador. In 1549 the present name was adopted on its becoming the capital of the Portuguese possessions, which distinction was transferred to Rio de Janeiro in 1763. The city suffered greatly during the commotions which led to the separation of Brazil from Portugal. The Portuguese evacuated it on July 1, 1823, since which it has acquired vast commercial importance as the foremost Brazilian city next to Rio. Since 1858 there has been railway communication between Bahia and Joazeiro. Captain Collins of the United States steamer Wachusett captured here on Oct. 7, 1864, the confederate cruiser Florida.

BÄHR, Johann Christian Felix, a German philologist, born in Darmstadt, June 13, 1798. He was educated at Heidelberg, and became professor there in 1826, and subsequently chief director of the university library, and of the lyceum and the philological seminary. His principal works are: *Geschichte der römischen Literatur* (3 vols., Carlsruhe, 1828; 4th ed., 1868), and *Herodot* (1832–'5; new ed., 4 vols., Leipsic, 1855–'61).

BAHRDT, Karl Friedrich, a German theologian, born at Bischofswerda, Aug. 25, 1741, died in Halle, April 23, 1792. He was a professor of theology, but his violent attacks upon the clergy and orthodoxy, and his adventurous and not very reputable life, involved him in perpetual difficulties; and for a year he was a prisoner of state in the Prussian fortress of Magdeburg, where he wrote his autobiography (4 vols., Berlin, 1790). His writings enjoyed a transient popularity, especially *Briefe über die Bibel im Volkston.* He denied the authenticity of miracles, and was a severe critic of the Scriptures. Kotzebue published *Dr. Bahrdt mit der eisernen Stirn.*

BAHREIN (or **AVAL**) **ISLANDS,** a group consisting of one large island and several smaller ones in the Persian gulf, in a bay on the E. coast of Arabia, between lat. 25° 30′ and 26° 30′ N., and lon. 50° and 50° 30′ E.; pop. about 60,000. The most important of them is Bahrein, about 27 m. long and 10 broad. The interior is hilly; the soil is fertile, and produces wheat, barley, dates, figs, and other tropical fruits. Springs are plentiful in the interior, but on the coast fresh water is procured in skins from springs beneath the surface of the sea, by divers. Manamah, the largest town, has a good harbor and is the centre of commerce. The island next in size is Moharrek, so named from the capital, situated on its southern side. It contains two or three forts close to the seashore, and the sheikh's palace. The Bahrein islands are noted for their extensive pearl fisheries, which were known to the ancients, and employ a large number of boats, each manned with from 8 to 20 men. The annual value of the pearls is estimated at from $1,000,000 to $1,500,000. Tortoise shell, shark fins, and dates are also exported. The inhabitants are Arabs, governed by a sheikh tributary to the sultan of Oman.

BAIÆ (now *Baja*), an ancient seaport town and watering place of Italy, about 10 m. W. of Naples, on the bay of Baiæ, between the Lucrine lake and Cape Misenum, and opposite the town of Puteoli. The narrow strip of coast sheltered by a semicircular ridge of hills on which Baiæ stood was covered with the palaces and baths of the Roman nobles. For want of room they often built out into the sea, and remains of submarine foundations are still visible. The leading attractions of Baiæ seem to have been its mild climate, its numerous hot springs, and its delightful scenery. Julius Cæsar, Augustus, Tiberius, Caligula, Nero, and Caracalla all frequented this spot; and it was the favorite resort of Horace and most men of wit and fashion in his day. Moralists spoke of it as a hot-bed of vice and luxury. It retained its prosperity until the invasion of Theodoric the Goth. With the fall of the empire it ceased to be visited; its villas were left to decay, and the whole coast is now a desert. The springs, no longer confined, have formed stagnant pools, giving off unwholesome exhalations in summer. The ground is strewn with ruined fragments of bricks, marbles, and mosaics. The only buildings remaining are three or four edifices of a circular form, two of which were in all probability warm baths. Another is believed to have been a temple of Venus. The whole coast has evidently undergone great changes since the time of the Romans, and appears to have sunk several feet below its ancient level.

BAIKAL (Russ. *Svyatoe More*, holy sea), a lake in the S. W. part of eastern Siberia, on the boundary of the government of Irkutsk and of the new province of Transbaikalia, between lat. 51° and 56° N. and lon. 103° and 110° E. Its length from S. S. W. to N. N. E. is about 375 m., and its breadth from 20 to 70 m., making it, next to the Caspian and Aral, the largest inland body of water in Asia. The greatest depth, according to soundings taken in 1872, is over 600 fathoms at the extreme S. W. part of the lake. It is surrounded by desolate shores and by rugged though picturesque mountains, densely covered with forests, from whence issue innumerable streams. The Upper Angara river flows into the lake at its N. end, and the Lower Angara issues from it near the S. end, being its only outlet. The Selenga, flowing into it on the S. E., is its largest tributary. The greatest island of the lake, Olkhon, is separated by a narrow strait from the W. coast. The principal fisheries are in the Angara river, to which many kinds of salmon are carried through the Yenisei from the Arctic, especially the omul (*salmo autumnalis* or *migratorius*). Baikal is one of the very few lakes which contain fresh-water seals. Sturgeons abound in the Selenga river. They are captured in large numbers, and their skins exported to China. The golomynka (*calyonimus Baicalensis*), a fish 4 to 6 inches long and singularly fat, is never taken alive, but cast dead upon the beach in great quantities, especially after storms. Its oil is sold to the Chinese. The annual value of the fisheries is estimated at 200,000 rubles. The number of sailing vessels is about 50, and there are several steamers; and the activity in the mines of Transbaikalia, and the trade with the Amoor Country and China, are fast increasing. From November to May the lake is traversed on the ice. The shores of the lake and of the Angara and Selenga rivers are chiefly settled by Russians. There are various tribes which have been incorporated since 1856 under the name of the Baikal Cossacks. The Tunka Alps border the S. shore of the lake, and one of their summits, the snow-clad Kharma Davan, is 6,000 ft. high. The Baikalian mountains proper stretch N. E. from the Lower Angara, and are remarkable for their fantastic peaks, numerous rivulets, volcanic formations, thermal springs, and wealth in gold and silver and various gems. Earthquakes are frequent, and were especially violent in 1861–'2.

BAIL (law Fr., *bailler*, to deliver), in law, the delivery of a person out of the hands of the sheriff or other officer after arrest into the custody of one or more sureties, who undertake to be responsible for such person. The same term was also used to designate the sureties themselves, and this came to be its most common signification. Bail in civil cases is either for appearance, called bail below, or to the action, called bail above. The sureties in the first give an undertaking to the arresting officer that the defendant shall appear in the cause in accordance with the practice of the court, and, if the case is one requiring special bail, that he shall cause such bail to be duly entered and perfected. For the sufficiency of this bail the officer is responsible, and when it is accepted by him the defendant is discharged from his custody. Sureties in bail to the action undertake for the appearance of the party when final judgment shall have been rendered and process shall have been issued thereon to take the body of the defendant in satisfaction. The sureties may be excepted to by the plaintiff, in which case they must justify their responsibility on oath; but if not excepted to in due time, or if they justify after exception, the defendant's appearance is entered and the bail below is discharged. The bail piece is a certificate issued to the sureties attesting the taking of bail. Formerly the plaintiff was entitled to bail as of course in most cases, but now by the provisions of various statutes it is not generally demandable in civil suits, either in England or in the United States, except upon a showing that some tort has been committed to the damage of the plaintiff, or that his demand springs from the official or professional misconduct or default of the defendant, or, if the suit is upon contract, that there was fraud in contracting the debt, or in endeavoring to put property beyond the reach of process for its collection. The showing is by affidavit, and thereupon an order is made by a judge or commissioner that

the defendant be held to bail in a specified sum. Although on giving bail the defendant is set at liberty, he is supposed to be constantly in the custody of his sureties, who may, at any time before their liability has been fixed by forfeiture of the condition of their obligation, arrest and surrender him into custody in exoneration of themselves. "Common bail" is fictitious bail supposed to be entered by the defendant in cases where special bail is not required, or which the plaintiff enters for the defendant if he makes default.—In criminal cases it is provided by the statute 1 William and Mary, and also by the constitutions of the United States and of the several states, that excessive bail shall not be required; but what is excessive bail must be left to the judgment of the officer or court empowered to decide upon it. Formerly the accused party was not allowed to give bail in cases of felony, but now he is permitted to do so except in cases of the highest crimes, and even then unless the proof of guilt is apparent or the presumption great. The undertaking of the sureties is for the appearance of the defendant to abide the order of the court, and is in the form of a recognizance.—The term bail is also sometimes applied in law to those who become sureties for a party for the payment of money or the performance of some other act, in cases where no arrest has been or could be made.

BAILEY, Gamaliel, an American journalist, born at Mount Holly, N. J., Dec. 3, 1807, died at sea, June 5, 1859. He studied medicine in Philadelphia, taking his degree in 1828. After making a brief visit to China in the capacity of physician to a ship, he began his career as an editor in Baltimore, in conducting the "Methodist Protestant." In 1831 he removed to Cincinnati, and in 1836 joined James G. Birney in conducting the first anti-slavery newspaper in the West, the "Cincinnati Philanthropist." During the first year their printing establishment was twice assailed by a mob, the press thrown into the Ohio river, and the books and papers burned. In 1841 his press was again destroyed by a mob, but he continued the publication of his paper in Cincinnati till after the presidential election of 1844. He was afterward selected to be the editor of a new anti-slavery paper at Washington, under the auspices of the American and foreign anti-slavery society, and the "Philanthropist" became merged in the "National Era," the first number of which appeared Jan. 1, 1847. In 1848 he had his last conflict with popular violence, when a mob for three days besieged his office. The "Era" was an influential organ of the anti-slavery party, and had some literary pretensions. It was the medium for the first publication of Mrs. Stowe's "Uncle Tom's Cabin." At the time of his death Dr. Bailey was on a voyage to Europe for the benefit of his health.

BAILEY, Jacob Whitman, an American naturalist, born at Ware, Mass., April 29, 1811, died at West Point, N. Y., Feb. 27, 1857. He graduated at the West Point military academy in 1832, and was appointed lieutenant in the artillery. After passing six years at several military stations in Virginia and Carolina, he was appointed professor of chemistry, botany, and mineralogy at the military academy in 1839. He was especially distinguished as a microscopist. He published a volume of "Microscopic Sketches" containing about 3,000 original figures, and gave much attention to the minute animal and vegetable organisms at that time all included under the general term infusoria, and to the whole family of algæ. Among the principal subjects of his research were the fossil deposits of Richmond and Petersburg in Virginia, the rice fields of the South, and the dredgings of the coast survey and of the line of soundings across the Atlantic, made by Lieut. Berryman in reference to the laying of the telegraphic cable. He made a microscopical collection of more than 3,000 objects, fixed upon slides, catalogued, and marked. His collection of algæ was equally complete, consisting of about 4,500 specimens, systematically arranged in portfolios. These collections, together with all his books on botany and microscopy, his sketches, scientific correspondence, and a large store of rough material from the localities he had studied, he bequeathed to the Boston society of natural history. He also made improvements in the microscope.

BAILEY, or **Baily, Nathan,** an English lexicographer, a schoolmaster at Stepney, near London, died in 1742. His most important publication was an "Etymological English Dictionary" (2 vols. 8vo, London, 1726; 2d ed., 1737; best ed., by J. Nicol Scott, folio, 1764), which furnished the basis of Dr. Johnson's famous work. He was the author also of a *Dictionarium Domesticum*, and of several school books.

BAILEY, Philip James, an English poet, born in the parish of Basford, Nottinghamshire, April 22, 1816. He assisted his father, Thomas Bailey, in editing the "Nottingham Mercury," and also studied law, being called to the bar in London in 1840; but his poem of "Festus," finished in 1836 and published in 1839, having attracted great attention, he devoted himself to literature. He has since published "The Angel World" (1850); "The Mystic" (1855); "The Age: Politics, Poetry, and Criticism" (1858); and "International Policy of the Great Powers" (1861).

BAILEY, Samuel, an English philosopher, born in Sheffield in 1791. He was a banker for many years, and has spent his whole life in Sheffield. He attracted great attention by his "Essays on the Pursuit of Truth and on the Progress of Knowledge" (1821), and "Essays on the Formation and Publication of Opinions" (1829). Among his later works are: "The Theory of Reasoning" (1851); "Discourses on Various Subjects, Literary and Philosophical" (1852); "Letters on the Philosophy of the Human Mind" (1855–'63); and "On the Received Text of Shakespeare's Dramatic Writ-

ings and its Improvement" (2 vols., 1862–'6). He is a utilitarian and a follower of Locke.

BAILEY, Theodorus, an American naval officer, born in New York in 1803. He entered the navy as midshipman in 1818, and was made lieutenant in 1827, commander in 1849, and captain in 1855. In the latter part of 1861 he was ordered to the steam frigate Colorado, with which he participated in the bombardment of the confederate works near Pensacola. In the capture of the Mississippi forts by the squadron of Flag Officer Farragut (April, 1862), he commanded the second division of the attacking force. On the reorganization of the navy in 1862 he was made commodore, and as acting rear admiral succeeded to the command of the eastern gulf blockading squadron, where he was very successful in breaking up blockade-running on the Florida coast. He was promoted to rear admiral July 25, 1866, and in the following October placed on the retired list.

BAILIFF (Fr. *bailli*, Lat. *balivus*), a person to whom some authority or charge is committed. The term as used by the Normans designated the chief magistrates of counties or shires, and bailiwick is still retained in writs and other judicial proceedings as defining the extent of jurisdiction within which the process may be executed, usually the same as county. It came into general use as a designation of any judicial or ministerial office performed by a deputy of a local magistrate; but as the judicial functions of sheriffs and lords having private jurisdiction declined, bailiffs were known as the ministerial deputies of sheriffs. A bound bailiff (vulgarized into bum-bailiff) is a sheriff's officer who has given sureties to the sheriff for his official conduct. The term bailiff was also applied in England to magistrates of certain towns, keepers of castles, &c., and is still used to some extent in one or other of these senses, but more commonly expresses a steward or agent of a lord or other large land proprietor. In the United States it is sometimes, but rarely, used for a sheriff's deputy or constable, and is occasionally met with as a legal designation of an agent liable to account for the rents or profits of property intrusted to him. In Scotch law a synonymous term, bailie, is applied to a ministerial officer to whom writs are directed. It is also used to designate a city magistrate similar to an alderman in England.

BAILLET, Adrien, a French scholar and writer, born at Neuville, in Picardy, June 13, 1649, died Jan. 21, 1706. He was educated for the church, but devoted his life to study and authorship. His most important publication was entitled "Judgments of the Learned upon the Principal Works of Authors," a book of criticism which taught better rules than it illustrated. He also produced a book on "Devotion to the Holy Virgin," the lives of the saints, which extended to 4 volumes, a life of Descartes, a history of Holland from 1609 to 1690, and numerous other works. For 26 years he was librarian to M. de Lamoignon, advocate general of the parliament of Paris, and made a catalogue of his library in 35 vols. folio.

BAILLEUL, a town of France, department of Nord, near the Belgian frontier; pop. in 1866, 5,970. Its manufactures embrace lace, thread, linen, perfumes, beet sugar, snuff, crockery, and pottery. Bailleul cheese is noted for its excellence.

BAILLIAGE (territory of a bailiff), a French term equivalent to bailiwick in English. In Switzerland the term was applied to districts into which the aristocratical cantons were divided, and over which bailiffs were appointed by the governed, and also to those territories which were subject to two or more of the cantons and governed by bailiffs appointed by and responsible to such cantons. These Swiss bailliages anciently formed part of the Milanese. Their names were Mendrisio, Balerna, Locarno, Lugano, Val Maggia, Bellinzona, Riviera, and Val Brenna. Most of these were ceded to the Swiss cantons in 1512 by Maximilian Sforza, in gratitude for Swiss aid in recovering the duchy of Milan from the troops of the French king, Louis XII. In 1802 the canton of Tessin was formed by Bonaparte out of the Italian bailiwicks, which arrangement was confirmed by the European sovereigns after his abdication in 1814, and also by the Helvetic diet.

BAILLIE, Joanna, a Scottish poet, born at Bothwell, Lanarkshire, in 1762, died at Hampstead, near London, Feb. 23, 1851. Her father, a Presbyterian clergyman, who afterward became professor of divinity in Glasgow university, gave her a sound education. When her brother, Dr. Matthew Baillie, commenced practice in London, she and her sister Agnes removed to that city and took up their residence at Hampstead, where they lived for over 60 years. In 1798, at the age of 36, Miss Baillie published the 1st volume of her "Plays on the Passions," and successive volumes appeared in 1802, 1812, and 1836. Each of these plays was intended to illustrate the effect of a single ruling passion on life and character. A volume of miscellaneous plays appeared in 1804; it contained a Highland tragedy called "The Family Legend," which Scott (who made her acquaintance in 1806) caused to be represented at the Edinburgh theatre early in 1810, with a prologue by himself and an epilogue by Henry Mackenzie. "De Montfort" ran for 11 nights at Covent Garden theatre, Mrs. Siddons and John Kemble playing the leading parts. At a later period Kean produced this play, but it failed. Her plays "Henriquez" and "The Separation" were also brought out in London. She also wrote two plays published separately, called "The Martyr" and "The Bride." Her dramas were written rather for the closet than the stage, and, though greatly admired by the most competent critics, had but moderate success when acted. Besides ballads, fugitive pieces, occasional poems, and songs (many of them in the Scottish dialect, and humorous), Miss Baillie published metrical legends of exalt-

ed characters, and a prose dissertation called "A View of the General Tenor of the New Testament regarding the Nature and Dignity of Jesus Christ." Miss Baillie was greatly esteemed by two generations of scholars. Her poetical works were collected and published in 1851.

BAILLIE, Matthew, a Scottish physician, born at the manse of Shotts, Lanarkshire, Oct. 27, 1761, died at Cirencester, Gloucestershire, Sept. 23, 1823. He was the elder brother of Joanna Baillie, and nephew of William and John Hunter, the anatomists. Having spent several years at the Glasgow university and one year at Balliol college, Oxford, he went to London in 1780 to study under the direction of Dr. William Hunter, to whom two years after he became assistant and demonstrator. In 1783, on the death of Dr. Hunter, who bequeathed him his anatomical theatre and the use of his museum for 30 years, Mr. Baillie commenced giving lectures in conjunction with Mr. Cruikshank, the anatomist. He was for 13 years physician to St. George's hospital, and in 1795 published a very valuable treatise on morbid anatomy, which was translated into German, French, and Italian. He afterward published a 4to volume of illustrations to this work. By the time he was 40 his fees in one year (during which he said he had scarcely time to take a regular meal) amounted to £10,000. He bequeathed his medical library and his valuable collection of anatomical preparations to the college of physicians, with £600 to keep them in a perfect state of preservation. His lectures were published after his death.

BAILLIE, Robert, a Scottish theologian, born at Glasgow in 1599, died in July, 1662. He was educated at the Glasgow university and ordained by Archbishop Law in 1622. In the religious controversies of the day he generally preserved a moderate tone. He was a member of the general assembly of 1638, which protested against the episcopacy, and in 1640 was chosen as commissioner to London to prefer charges against Archbishop Laud. On his return to Glasgow in 1642 he became a professor of divinity in the university, and in the following year he was sent as a delegate to the Westminster assembly of divines, where he maintained the rights of the presbytery with great spirit. After the execution of Charles I. in 1649 he was sent to Holland to invite Charles II. to accept the crown and covenant of Scotland. After the restoration in 1660 he was made principal of the Glasgow university. Dr. Baillie wrote *Opus Historicum et Chronologicum* (Amsterdam, 1663) and many other works, mostly theological pamphlets and discussions. His "Letters and Journals," of great historical value, were first published in 1775, at the instance of Hume and Robertson (new ed., 3 vols. 8vo, 1841–'3).

BAILLOT, Pierre Marie François de Sales, a French violinist, born at Passy, near Paris, Oct. 1, 1771, died in Paris, Sept. 15, 1842. He was a professor in the conservatoire for many years, and wrote several treatises and addresses on musical subjects. He travelled in Russia, Belgium, Holland, and England, and was considered without a rival in the severely classical style.

BAILLY, Jean Sylvain, a French astronomer and statesman, born in Paris, Sept. 15, 1736, guillotined Nov. 12, 1793. His father was an artist, and intended that he should follow the same profession; but he was attracted more by poetry and belles-lettres until his acquaintance with La Caille, when he turned his attention to astronomy. In 1763 he was admitted to the academy of sciences, and published a reduction of La Caille's observations on the zodiacal stars. He competed with Lagrange for the academy's prize on the theory of Jupiter's satellites in 1764. His treatise on that subject, published in 1766, contains a history of that department of astronomy. In 1771 he published a treatise on the light of those bodies. The 1st volume of his "History of Astronomy" appeared in 1775, the 4th in 1783. To these he afterward added a volume on oriental astronomy. He also published letters to Voltaire on the origin of the sciences and of the people of Asia, and on Plato's Atlantis. In 1784 he was chosen secretary of the academy of sciences and admitted to the French academy, and the next year to the academy of inscriptions. About this time he wrote his graceful and eloquent *éloges* on Charles V., Corneille, Leibnitz, Molière, and La Caille. In 1784 he was one of the commissioners to investigate Mesmer's discoveries, and made a clear and sagacious report on the subject. He espoused the democratic cause in the revolution, was elected from Paris in 1789 first deputy of the *tiers-état*, and was chosen president of the popular division of the states general in Versailles. When the national assembly was formed, he retained the presidential chair, and dictated the oath by which the members swore that they would "resist tyrants and tyranny, and never separate until they had secured a free constitution." In July, 1789, he was chosen mayor of Paris, and discharged his duties during 26 months with great firmness and wisdom. His vigor in suppressing a riotous demonstration on the Champ de Mars, July 17, 1791, and in defending the queen from charges brought against her, having lessened his popularity, he resigned his office in September, but was induced to retain it two months longer. He then lived for some time at Nantes, and afterward with Laplace at Melun; but in 1793 he was seized by the Jacobin soldiery, and dragged to Paris, where he was charged with being a royalist conspirator and executed. He is considered one of the noblest victims of the reign of terror. Several posthumous works of his have appeared; the most noted are an "Essay on the Origin of Fables and Ancient Religions," and his "Memoirs of an Eye-witness of the Revolution," embracing the period from April to October, 1789.

BAILMENT (Fr. *bailler*, to deliver), in law, the delivery of a thing upon some trust, express or implied, usually the redelivery of the thing itself or its equivalent, or some disposition of it according to the direction of the bailor. The different kinds of bailment are: 1, a deposit for safe keeping; 2, lending or hiring for use of bailee; 3, a pledge or pawn as security for something done or to be done by pawnee; 4, delivery of a thing for the purpose of having work done upon it, or of being carried to some place designated. When the bailment is exclusively for the use of the bailee, as where a thing is borrowed for use by bailee, the strictest degree of care is required. If the trust is to keep the thing bailed or to do something in respect to it for the benefit of bailor without compensation, ordinary care, such as a man bestows upon his own property, is all that is required; and if he is habitually careless about his own affairs, he is not bound to do more for another than he does for himself. If the trust is for mutual benefit, as when goods are to be kept or something done respecting them for a reward, ordinary diligence is to be exercised, such as prudent and careful men would give to their own affairs. In respect to two classes of bailments, the rule of law is peculiar, viz., the cases of innkeepers and common carriers; both of whom are made responsible absolutely for the goods intrusted to them, except against inevitable accident called the act of God, and against the act of the public enemy. It is not sufficient that they use the utmost care; they are held to be insurers of the safety of the goods except as above specified. The innkeeper therefore is answerable for the property of his guest, even if lost by theft or burglary; and a carrier for the goods in his charge, against every casualty except loss by lightning or tempest, and he is not exonerated in case of destruction by fire, in which last particular the rule is even more severe than it is in respect to the innkeeper. The English law of bailment was quite imperfect until the time of Lord Holt, who resorted to the civil law to supply the deficiency then existing in the adjudged cases. His classification, as given in Coggs v. Bernard, Lord Raymond's Reports, 909, is famous. Sir William Jones was the first English writer who treated of this subject at length; but he had been anticipated in France by Pothier, whose work on "Obligations" is now an acknowledged authority in English and American law. The American treatises of Justice Story and Mr. Edwards give the results of the more recent cases.

BAILY, Edward Hodges, an English sculptor, born at Bristol, March 10, 1788, died May 22, 1867. His father was a ship carver. The son was placed in a counting house, but his taste for art led him to take up the vocation of a modeller in wax, in which he gained some reputation. In 1807 he went to London, and entered the studio of Flaxman. From the society of arts and sciences he received the silver medal, and from the royal academy he gained both the gold and silver medals, and a purse of 50 guineas; his subject on the latter occasion being "Hercules restoring Alcestis to Admetus." At the age of 25 he produced the statue of "Eve at the Fountain." Among his other works were "Hercules casting Lichas into the Sea," "Apollo discharging his Arrows," the colossal statue of Nelson in Trafalgar square, well known statues of Earl Grey, Sir Astley Cooper, and Sir Robert Peel, portions of the sculptures at Buckingham palace, "Eve listening to the Voice," "Preparing for the Bath," "The Graces," "The sleeping Nymph," and "The fatigued Huntsman."

BAILY, Francis, an English astronomer, born in 1774, died in 1844. He was a London broker, and author of several works on annuities, assurances, and kindred subjects, but devoted the last years of his life almost wholly to the service of the astronomical society and the British association. He prepared the astronomical society's star catalogue, and contributed many important papers to its memoirs. Sir John Herschel wrote his biography.

BAIN, Alexander, a Scottish philosopher, born in Aberdeen in 1818. He was educated at Marischal college, and was teacher of moral and natural philosophy there 1841–'5, professor of natural philosophy at the Andersonian university 1845–'6, assistant secretary of the metropolitan sanitary commissioners 1847–'8, and of the general board of health 1848–'50, examiner in logic and moral philosophy at the university of London 1857–'62, examiner in moral science for the India civil service 1858–'60 and 1863, and professor of logic and English literature in the university of Aberdeen 1860–'64. In the latter year he again became examiner in the university of London. He became a contributor to the "Westminster Review" in 1840, wrote for the "Cyclopædia" and other publications of the Messrs. Chambers, including text books on various sciences for their school series, and edited Paley's "Moral Philosophy," with dissertations and notes (1852). His principal works are: "The Senses and the Intellect" (1855); "The Emotions and the Will" (1859); "The Study of Character" (1861); "English Composition and Rhetoric" (revised ed., 1866); "Mental and Moral Science" (1868); and "Logic" (1870).

BAINBBIDGE, William, an American naval officer, born in Princeton, N. J., May 7, 1774, died in Philadelphia, July 28, 1833. He had a command in the merchant service, when, upon the reorganization of the navy in 1798, he received the commission of lieutenant. In September of that year, while cruising off Guadeloupe, his vessel was captured by a French squadron, and he and his officers and men were held as prisoners until December following. On his return to the United States he was promoted, and appointed to the command of the brig Norfolk, in which vessel he cruised in the West Indies during a large portion of the

trouble with France. In May, 1800, he was promoted to the rank of captain, and appointed to the frigate George Washington, which was ordered to carry a large amount of tribute to the regency of Algiers. After the completion of this mission the dey compelled him, by threats of capture and of a declaration of war, to convey an Algerine embassy to Constantinople, where Bainbridge during a stay of two months was treated with great distinction. He returned to the United States in 1801, and was soon employed in the Mediterranean again in command of the frigate Essex. Upon the declaration of war against the United States by Tripoli in 1803, he was appointed to the frigate Philadelphia, one of the vessels of the squadron sent against that power under the command of Commodore Edward Preble. He displayed great vigor in this service, capturing on Aug. 26 a Moorish frigate with an American prize; but on Oct. 31 his vessel ran aground, and was captured and carried to Tripoli, where Bainbridge and his men to the number of 315 were retained as prisoners till the close of the war, a period of 19 months. On his return to the United States in 1805, Bainbridge was received with very general demonstrations of kindness and respect. A court of inquiry was held for the loss of the Philadelphia, and the result was an honorable acquittal; and under the act of April, 1806, reorganizing the navy, he became the seventh on the list of captains. On the declaration of war in 1812 Capt. Bainbridge united with Capt. Stewart in an effective remonstrance against the government's project of laying up the ships of war through fear of the immense superiority of the enemy at sea. In September, 1812, Bainbridge, now a commodore, was appointed to the command of a squadron, consisting of the Constitution, 44 guns (flag ship), Essex, 32, and Hornet, and sailed from Boston on Oct. 25 for a cruise. On Dec. 26, in a severe engagement off San Salvador, the Constitution captured the British frigate Java, 49 guns, the Java losing her commander, Capt. Lambert, and 174 men, and the Constitution 33 men. On his return to the United States Bainbridge was everywhere received with enthusiasm; congress voted a gold medal to him, and silver ones to his officers, and $50,000 were distributed to the crew as prize money. In 1815 he was appointed to the command of a squadron of 20 sail, intended to act against Algiers, but peace was concluded before it reached the Mediterranean. Bainbridge, however, during this command, settled disputes with the Barbary powers. Upon his return he was appointed to command afloat at Boston. In 1819–'21 he again commanded in the Mediterranean. From this time until his death he was almost constantly employed in important shore service, being for some time president of the board of navy commissioners.

BAIRAM, a Persian term designating the two principal holidays of Islam, which are celebrated with great festivities, especially the little Bairam (Turk. *kutchuk bairam;* Arab. *aid el-saghir*, the little feast, or *aid el-fethr*, the feast of fast-breaking). It succeeds Ramadan, beginning at sunrise of the first day of the month of Shevval, and lasts three days, the mosques being illuminated, the sultan holding public receptions, salutes being fired, and every one who can afford it putting on new dresses. The Turkish capital and its environs exhibit during this period great animation. Sixty days after the little Bairam is the festival of the great Bairam (Turk. *buyuk bairam*, generally *kurban bairam;* Arab. *aid el-kebir*, the great feast, or *aid el-korban*, the feast of sacrifice). It begins on the 10th of the month of Zilhije, and lasts four days, during which sheep and oxen are sacrificed, and the same festivities observed as during the little Bairam. Every family or two families in conjunction kill a lamb. At Mecca sheep, oxen, and camels are slaughtered, and the flesh is distributed among the poor pilgrims. The sultan on both occasions visits the mosque with great ceremony. He also holds public receptions attended by the foreign ministers and Turkish officials, the latter being treated to a banquet, and 16 of them receiving presents of robes furred with sable. Formerly the ambassadors also received presents.

BAIRD, Sir **David,** a British general, born at Newbyth, Scotland, Dec. 6, 1757, died Aug. 18, 1829. He went to India as captain in the 73d Highlanders, and in 1780 was wounded and taken prisoner in the disastrous affair near Conjeveram in the Carnatic, where Hyder Ali destroyed an entire British detachment. He was held captive at Seringapatam nearly four years, and when that fortress was taken by assault in 1799, Baird, then a major general, commanded and led the storming party. For his gallantry on this occasion he received the thanks of parliament. Dissatisfied with the preference shown to Wellesley, he obtained leave of absence in 1803, and returned to England, where he was received with great distinction. In 1805 he commanded an expedition against the Dutch settlements at the Cape of Good Hope; in 1807 he led a division in the attack on Copenhagen; and in 1808 he joined Sir John Moore in Spain, succeeding to the command when that officer fell at Corunna. He was severely wounded, however, and obliged to retire from active service. He was knighted in 1804, and created a baronet after the victory of Corunna in 1809.

BAIRD, Robert, D. D., an American clergyman and author, born of Scotch parentage in Fayette county, Penn., Oct. 6, 1798, died at Yonkers, N. Y., Nov. 15, 1863. He was educated at Jefferson college, Pennsylvania, and at the Princeton theological seminary, and in 1822 took charge of an academy in Princeton. He became agent of the missionary society of New Jersey in 1828, and did much toward laying the foundation of the present system of public school education in that state. In 1829

he was appointed agent of the American Sunday school union, and succeeded in raising the annual revenue of the society from $5,000 to $28,000. In 1835 he visited Europe, and remained abroad, with the exception of two brief visits home, for eight years, striving to revive the Protestant faith in the southern countries of Europe, and to promote the cause of temperance in the northern countries. Upon the formation of the foreign evangelical society, afterward merged in the American and foreign Christian union, he was made its agent and corresponding secretary. In the summer of 1842 Dr. Baird published in Scotland a work entitled "Religion in America," which was translated into several of the continental languages. Among his other works were "A Visit to Northern Europe," "Protestantism in Italy," "History of the Albigenses, Waldenses, and Vaudois," and "History of the Temperance Societies of the United States."

BAIRD, Spencer Fullerton, an American naturalist, born at Reading, Penn., Feb. 3, 1823. He was educated at Dickinson college, and in 1846 became professor of natural science in that institution. In 1850 he was appointed assistant secretary of the Smithsonian institution in Washington, which position he still occupies (1873). His first scientific and literary work of any magnitude was a translation from the German of the *Bilder-Atlas* of Heck, a supplement to the *Conversations-Lexikon* of Brockhaus, in which he was assisted by several scholars in different specialties ("Iconographic Encyclopædia," 4 vols. 8vo of text and 2 vols. 4to of plates, New York, 1849 *et seq.*). His next important publication was the report on the mammals of North America, constituting vol. viii. of the "Reports of the Survey of the Railroad Routes to the Pacific." This, which appeared in 1857, was followed in 1858 by a still more extended work (vol. ix. of the series) upon the birds of North America. In 1864 he commenced the publication of a work, under the auspices of the Smithsonian institution, upon the birds of the new world generally, under the title of "Review of American Birds in the Museum of the Smithsonian Institution." He has also been engaged for several years in preparing a new account of the birds of North America, which is now (1873) in press, and in which he is assisted by Dr. T. M. Brewer of Boston. In 1871 he was appointed by President Grant United States commissioner of fish and fisheries, for the purpose of making inquiries into the causes of the decrease of the supply of food fishes of the United States, and the methods of restoring it. Numerous minor papers upon mammals, birds, reptiles, and fishes of North America have appeared from his pen in the "Proceedings" of the academy of natural sciences of Philadelphia, the New York lyceum of natural history, and elsewhere.

BAIREUTH, or **Bayreuth,** a city of Bavaria, capital of the circle of Upper Franconia, on the left bank of the Red Main, about 50 m. by railway N. N. E. of Nuremberg; pop. in 1871, 17,837, chiefly Protestants. The town is well built and partly surrounded by ancient walls. It has a castle, riding school, gymnasium, theatre, public library, and public garden, an active trade, principally in grain, several breweries and distilleries, and manufactures of woollen and cotton fabrics, leather, and earthenware. There are three palaces in the vicinity. The Hermitage palace is a fanciful building, where Frederick the Great and his sister the margravine of Baireuth resided. Schwanthaler's

Baireuth.

bronze statue of Richter, who died and was buried here in 1825, is in the Gymnasiumsplatz, and an inscription in gold letters marks his house in the Friedrichsstrasse. In front of the old castle, now used for government offices, is a monument in honor of Maximilian II. erected in 1860, and in the square in front of the new castle stands an equestrian statue of the margrave Christian Ernst. The corner stone of a great festival theatre, designed by Richard Wagner for the promotion of the German lyric drama, and especially for the performance of his own *Nibelungen* trilogy, was laid at Baireuth in 1872.—Baireuth was formerly the capital of the principality of the same name (previously of Kulmbach), the history of which was long associated with that of the principality of Anspach. Christian, a son of the elector John George of Brandenburg, who at the beginning of the 17th century succeeded as ruler of Baireuth, while his brother became prince of Anspach, removed the capital from Kulmbach to Baireuth. In 1763, on the death of the margrave Frederick, who had greatly promoted public prosperity, Baireuth and Anspach were united into one principality, and both ceded to Prussia in 1791. After passing under the power of the French in 1806, Baireuth was transferred to Bavaria in 1810.

BAIUS, or **De Bay, Michael,** a Flemish theologian, born at Melin in Hainault in 1513, died Sept. 16, 1589. He was educated at the university of Louvain, in which he became a professor and ultimately chancellor. His zealous advocacy of the doctrine of St. Augustine brought him into collision with his colleagues, who in 1552 laid 18 of his most objectionable dogmas before the university of Paris, which in 1560 condemned 15 of them as heretical and the other three as false. Notwithstanding this decision, the Spanish court sent Baius as its representative to the council of Trent in 1563. In the two following years he published various controversial works, which called forth on Nov. 1, 1567, the denunciatory bull of Pope Pius V., which anathematized 76 of his favorite dogmas, but did not name him. Baius afterward recanted and professed obedience, was engaged a few years later in similar controversies, and made a second retraction in 1580. The contest was renewed from time to time until his death. His works were published at Cologne in 1696, and his doctrines subsequently became the basis of Jansenism.

BAJAZET, Bajazid, or **Bayazid. I.** An Ottoman sultan, born in 1347, died in 1403. He succeeded his father Amurath I., who was killed at the hour of victory in the battle of Kosovo in 1389, and to prevent any trouble with his family strangled his younger brother. He was incessantly occupied in the first years of his reign in subduing his rebellious subjects or adding to his conquests. In Europe his armies penetrated beyond the Danube, into Wallachia and Hungary, subdued the countries around the Balkan, and devastated parts of Greece. He brought the whole of Asia Minor under the Turkish government. In 1391 he subdued Philadelphia, the last of the Greek cities of Asia, and in 1394 laid siege to Constantinople, continuing it for years. European nations became alarmed at his progress, and Sigismund, king of Hungary, with a large army reënforced by a select body of French troops, set out to check his progress; but in 1396 Bajazet utterly routed his army near Nicopolis. He overran the whole of the Morea, but his career of conquest was checked by Tamerlane, who invaded his possessions in Asia Minor. The two conquerors met on the plains of Angora in Galatia with immense armies in 1402, and Bajazet was totally defeated and taken prisoner, and, according to accounts which modern historians do not consider literally true, was carried about in an iron cage till his death. On account of the rapidity of his movements Bajazet was called Ilderim (the lightning). He was succeeded by Mohammed I. **II.** An Ottoman sultan, son of Mohammed II., the conqueror of Constantinople, born in 1447, died in 1512. On his father's death in 1481, his brother Zizim disputed the succession. He was defeated, however, and fled to Egypt, and afterward to Rhodes, whence D'Aubusson, the grand master, sent him to France. Bajazet's hatred pursued him in his exile, and is believed to have procured his death by poison. Bajazet was continually engaged in war, with varying success, against the Venetians, the Egyptians, and the Persians. His reign was brought to a close by the rebellion of three of his sons, claimants of the throne, in which Selim, the youngest, was at last successful, and Bajazet abdicated in his favor, and was poisoned by him a few days later. During the reign of Bajazet II. the Venetians obtained the right to appoint a consul at the Sublime Porte, and treaties were concluded with Poland and the czar.

BAJAZID, or **Bayazid,** a fortified town of Turkish Armenia, 150 m. E. S. E. of Erzerum, S. W. of Mount Ararat; pop. variously estimated at from 5,000 to 15,000, mostly Kurds. It lies around a hill crowned by a citadel, and has a palace, arsenal, mosque, and monastery. The town, which is the capital of a sanjak, has declined since the Russian conquest of Georgia.

BAKACS, Tamás, a Hungarian statesman and prelate, died in 1521. The son of a serf, he became by his talents secretary of King Matthias Corvinus, who ennobled him, and after whose death he labored for the accession of Ladislas II. of Bohemia to the throne (1490). The latter accordingly made him chancellor, which office he relinquished in 1505 for a cardinal's hat, having previously been the incumbent of various episcopal sees, and finally of the archbishopric of Gran. He even aspired to the holy see, but succeeded only in being appointed legate in Hungary, and in

being allowed to hold simultaneously, contrary to law, many ecclesiastical endowments and functions. On the death of Pope Julius II. (1513) he revisited Rome, still in the hope of winning the papacy; and when this hope was blasted by the election of Leo X., he obtained permission to preach a crusade against the Turks. But the army of peasants and vagabonds which rallied under Dózsa in obedience to his appeals, instead of fighting the infidels, turned their arms against the Hungarian nobility and committed frightful ravages, until they were routed by John Zápolya. This peasants' war, and the somewhat suspicious part played in the whole movement by Bakacs, have been graphically described in *Magyarország 1514-ben* ("Hungary in 1514"), by Baron Eötvös (3 vols., Pesth, 1847–'8). The families Erdödi and Pálffy inherited the vast fortune of Bakacs.

BAKALAHARI, the oldest of the African Bechuana tribes, occupying the great Kalahari desert, between the Orange river, lat. 29° S., and Lake Ngami, and between lon. 24° and the Great Fish river. They are found roaming with the Bushmen, but retain the characteristics of the Bechuana tribes, and exhibit an inclination to industrial pursuits and settled life. They cultivate the thin soil, rear goats, and carry on a small traffic in furs.

BAKER, the name of counties in four of the United States. **I.** A central county of Alabama, bounded E. by the Coosa river, and watered by affluents of that stream and of the Alabama and Cahawba; area, 665 sq. m.; pop. in 1870, 6,194, of whom 1,137 were colored. The Selma, Rome, and Dalton, and the South and North Alabama railroads traverse the county. The chief productions in 1870 were 11,728 bushels of wheat, 131,311 of Indian corn, 6,238 of oats, 29,571 of sweet potatoes, and 1,360 bales of cotton. Capital, Grantville. **II.** A N. E. county of Florida, bounded N. and N. E. by Georgia, from which it is partly separated by the N. fork of the St. Mary's river; area, 570 sq. m.; pop. in 1870, 1,325, of whom 290 were colored. It is watered by several streams and small lakes, and the Okefenoke swamp extends in the N. W. portion. The Florida Central railroad passes through the county. In 1870 the county produced 10,403 bushels of corn, 1,715 of oats, 6,150 of sweet potatoes, 83 bales of cotton, 29 hhds. of sugar, and 3,075 gallons of molasses. Capital, Sanderson. **III.** A S. W. county of Georgia, bounded S. E. by Flint river and intersected by Ichawaynoochaway creek; area, 1,400 sq. m.; pop. in 1870, 6,843, of whom 4,955 were colored. The surface is level and the soil fertile. The chief productions in 1870 were 153,986 bushels of Indian corn, 5,684 of sweet potatoes, and 5,556 bales of cotton. Capital, Newton. **IV.** A S. E. county of Oregon, bounded E. by Idaho, and S. by Nevada; area about 6,000 sq. m.; pop. in 1870, 2,804, of whom 680 were Chinese. It is watered by the Owyhee and Malheur rivers, and other branches of the Saptin or Snake, which runs on its E. border. The Blue mountains skirt the N. W. corner. The county has mines of gold and silver. In 1870 the chief productions were 2,306 bushels of wheat, 37,426 of oats, 17,732 of barley, 7,377 of potatoes, and 1,944 tons of hay. Capital, Auburn.

BAKER, Edward Dickinson, an American senator and soldier, born in London, England, Feb. 24, 1811, killed at the battle of Ball's Bluff in Virginia, Oct. 21, 1861. The family emigrated to the United States in 1815, settling first in Philadelphia, and afterward at Belleville, Ill. Having been admitted to the bar, Baker took up his residence at Springfield, Ill. He was elected member of the legislature in 1837, of the state senate in 1840, and representative in congress in 1844. When the war with Mexico broke out in 1846, he resigned his seat in congress, became colonel of a regiment of volunteers from Illinois, was present at the siege of Vera Cruz, and commanded a brigade at the battle of Cerro Gordo. In 1848 he was again elected to congress, but declined, having become connected with the Panama railway. In 1852 he settled in California, where he practised law with success, took an active part in political discussions, and was nominated by the republicans for congress, but was not elected. He removed to Oregon, and in 1860 was elected to the United States senate from that state. When the civil war broke out he raised a regiment in New York and Philadelphia, of which he was appointed colonel, having declined a commission as general. At the battle of Ball's Bluff, where he commanded a brigade, he received several bullets, one of which passed through his head, killing him on the field.

BAKER, Henry, an English naturalist and teacher of the deaf and dumb, born in London, May 8, 1698, died Nov. 25, 1774. He was brought up to the bookselling business, but afterward devoted himself to scientific studies, and especially to observations with the microscope and to botany. He introduced into England several valuable exotic plants; among others, the large Alpine strawberry, and the *rheum palmatum*, or true rhubarb. He was a member of the society of antiquaries and of the royal society. He contributed several papers to the "Philosophical Transactions," and published, besides his microscopic observations, a small collection of poems. Many years of his life were spent in the instruction of deaf mutes, whom he taught to articulate after the method of Wallis and Holden. He married the youngest daughter of Daniel Defoe.

BAKER, Osmon Cleander, D. D., an American clergyman, bishop of the Methodist Episcopal church, born in Marlow, N. H., July 30, 1812, died Dec. 20, 1871. At the age of 15 he entered Wilbraham academy, and in 1830 went to the Wesleyan university, Middletown, Conn., where he studied three years, receiving a degree, although bad health prevented him from

finishing the usual studies. In 1834 he was appointed teacher in Newbury seminary, Vt., and in 1839 became its principal. This position he occupied till 1844, when he entered the work of the pastorate. In 1847 he was elected to a chair in theology in the Methodist general Biblical institute at Concord, N. H., since become the school of theology of the Boston university. Subsequently he was chosen president of this institution, where he remained till 1852, when he was elected bishop. His chief labors were in behalf of theological education. Among other writings, he was the author of a commentary on the ecclesiastical law and polity of the Methodist Episcopal church.

BAKER, Sir Samuel White, an English explorer, born June 8, 1821. In 1848, in conjunction with his brother, he established a model farm and coffee estate in the island of Ceylon. He gave some account of his life there in "The Rifle and the Hound in Ceylon" (1853) and "Eight Years' Wanderings in Ceylon" (1855). In 1861 he organized a large expedition for the purpose of discovering the head waters of the Nile, with the especial design of meeting and succoring Speke and Grant, who had set out from Zanzibar for the same purpose. Baker, accompanied by his wife, a Hungarian by birth, set out from Cairo, April 15, 1861, and on the 13th of June reached the junction of the Atbara with the Nile. For nearly a year he explored the regions of Abyssinia whence comes the Blue Nile, and in June, 1862, returned to Khartoom, at the junction of the Blue and the White Nile. Here he organized a party of 96 persons to explore the course of the White Nile. They set out Dec. 18, 1862, sailing southward up the river. They reached Gondokoro, lat. 4° 55′ N., lon. 31° 46′ E., on Feb. 2, 1863. Here on the 15th Baker was met by Grant and Speke, who coming from the south had discovered the Victoria N'yanza, which they believed to be the ultimate source of the Nile. They had left the river for some distance, but thought it probable that there was still another great lake connected with the Victoria N'yanza. Baker, resolved to supplement the explorations of Grant and Speke, started from Gondokoro by land, March 26, 1863, the route being first eastward, then nearly south, then trending toward the west. The journey was adventurous and toilsome, and Mrs. Baker suffered a sunstroke which nearly cost her life. On March 14, 1864, Baker came in sight of a great fresh-water lake, heretofore unknown, to which he gave the name of Albert N'yanza. (See N'YANZA.) After navigating a small portion of the lake, he set out on his homeward journey early in April, 1864; but owing to illness and the disturbed condition of the country, he did not reach Gondokoro until March 23, 1865. He then returned to England, where he received the honor of knighthood, and published an account of his explorations, "The Albert N'yanza" (London, 1866). In 1869 he returned to Africa, was created a pasha by the khedive of Egypt, and placed at the head of an expedition to put down the slave trade carried on by the natives and Arabs in the basin of the Nile.

BAKEWELL, a market town of Derbyshire, England, situated on the river Wye, near its junction with the Derwent, 20 m. N. N. W. of Derby; pop. in 1871, 10,727. It is the property of the duke of Rutland, whose seat, Haddon Hall, is two miles from the town. It has a spacious cruciform church founded in Saxon times, showing specimens of Gothic architecture of different periods, and on the opposite bank of the Wye are traces of a castle built by Edward the Elder in 924. Cotton mills were first established here by Arkwright, and there are coal and lead mines in the vicinity. There are also chalybeate springs and warm baths, formerly much resorted to. Chatsworth house, the splendid residence of the duke of Devonshire, is three miles distant.

BAKEWELL, Robert, an English agriculturist, born at Dishley in Leicestershire about 1725, died Oct. 1, 1795. He succeeded his father in 1760 as proprietor of the Dishley farm, where he introduced the long-horned breed of cattle and paid special attention to the development of sheep. His horses and pigs were also noted in their day. His aim was to secure cattle that would fatten on the smallest quantity of food. Mr. Bakewell introduced into English agriculture the practice of flooding meadows. He never contributed anything to literature, but Arthur Young, in his "Annals of Agriculture," fully described and praised his plans and improvements.

BAKHMUT, a town of S. Russia, in the government and 138 m. E. of the town of Yekaterinoslav; pop. in 1867, 10,392. The town has large establishments for rendering tallow, and near it are coal mines and alabaster quarries.

BAKHTCHISERAI (Turkish, palace of gardens), a Tartar town of the Crimea, now included in the Russian government of Taurida, in lat. 44° 47′ N., lon. 33° 54′ E., 23 m. N. E. of Sebastopol, in a long deep valley on the banks of the Tchuruk Su; pop. in 1867, 11,448, of whom 1,500 were Caraite Jews, Greeks, and Armenians, and the rest Tartars. The *khan serai*, or palace of the ancient khans of the Crimea, consists of a range of spacious buildings one story high, richly adorned with arabesques and inscriptions, a splendid mosque, beautiful marble fountains, and luxuriant gardens. The manufactures consist of morocco leather, saddlery and other leather articles, *beeza* (a spirit distilled from millet), silks, common cutlery, gold and silver plate, pottery, and arms. About four miles distant are the renowned seat of the Caraites, Tchufut Kalé, or Jews' Castle, and a deserted monastery containing 70 cells hewn out of the solid rock. Bakhtchiserai first became the residence of the khans about 1475. In the 16th century their dominion extended not only over the Crimea, but over all the outlying

territory from the Danube to the Caucasus. Gradually, however, Russia undermined their authority, until in 1783 it became extinct. During the siege of Sebastopol (1855) Bakhtchiserai was the headquarters of the Russian army.

BAKHTEGAN, a lake of Persia, in the province of Fars, in lat. 29° 30′ N., and between lon. 53° 30′ and 54° 30′ E.; length E. and W. upward of 60 m.; breadth 8 m. It dries up in summer, leaving immense quantities of salt.

BAKHTISHWA, the name of a Christian Nestorian family, which during the 8th, 9th, 10th, and 11th centuries gave six famous physicians to the court of Bagdad. Caliph Al-Hadi, after having been restored to health by the skill of Ben Giurgis Bakhtishwa in 786, proposed that all the physicians who had unsuccessfully practised upon him should be put to death; but Bakhtishwa saved the lives of his colleagues by administering poison to the caliph. At the beginning of the 9th century Giabril ben Giurgis ben Bakhtishwa, after helping Haroun al-Rashid over an apoplectic fit, was sentenced to death because the caliph had a relapse. His life was only saved by the death of the caliph. The most learned of the Bakhtishwas was Abu Sa, who flourished about the middle of the 10th century. He is the reputed author of a medical work in 50 chapters, dedicated to Caliph Motaki, and entitled the "Garden of Medicine."

BAKONY, or **Forest of Bakony,** a mountain range in Hungary, S. of the Danube, between the Raab and Lake Balaton, separating the great and little Hungarian plains. Its average height is about 2,000 ft. It is crowned with dense forests, and has quarries of very fine marble. Immense herds of swine are fed in the forest, and the keepers figure as robbers in Hungarian literature.

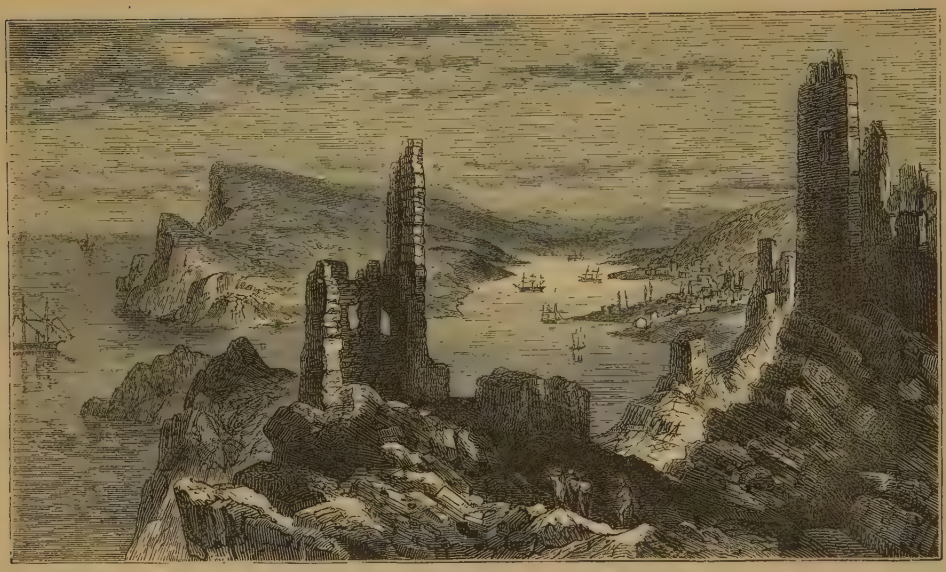
BAKU, or **Bakoo. I.** Formerly an independent khanate, now a government of Russia, in Transcaucasia, bordering on the Caspian sea, and comprising the territory of Shirvan and part of Daghestan; area, 14,922 sq. m.; pop. in 1867, 486,229, including Russians, Caucasians, Armenians, and Parsees. It is traversed by the easternmost ranges of the Caucasus, and watered by the Kur and the Aras. The peninsula of Apsheron, comprised within this government, is remarkable for its mud volcanoes and naphtha springs. Near the town of Baku there are about 100 bituminous springs, several of which are worked, producing white and black naphtha. The principal sources are situated at a spot called Balegan, about 6 m. from the city of Baku. The quantity annually obtained in the district amounts to about 36,000 lbs. of the pure and 9,600,000 lbs. of the black naphtha. The naphtha is used by the natives for illuminating purposes. The country for several miles round the town of Baku is impregnated with inflammable matter. About 15 m. N. E. of the town is a fire temple of the Guebres nearly a mile in circumference, from the centre of which rises a bluish flame. Here are some small houses, and the inhabitants when they wish to smother the flame cover the place, enclosed with walls, by a thick loam. When an incision is made in the floor, and a torch applied, the gas ignites, and when the fire is no longer needed it is again suppressed by closing the aperture. Not far from the town there is a boiling lake which is in constant motion, and gives out a flame altogether devoid of heat. After the warm showers of autumn the whole country appears to be on fire, and the flames frequently roll along the mountains in enormous masses and with incredible velocity. The fire does not burn, nor is it possible to detect the least heat in it, nor are the reeds or grass affected by it. These appearances never occur when the wind blows from the east. In former times the burning field was one of the most celebrated *ateshgahs* (shrines of grace) among the Guebres. Previous to its occupation by the Russians a voluntary human sacrifice was annually offered here—a youth who leaped with his horse into one of the fissures. A few adherents of this sect still make pilgrimages to the great ateshgah to worship the fire and perform penitential exercises, chiefly by night. The place is a walled quadrangle with an altar raised on a flight of steps in the centre. At each of the four corners stands a chimney 25 ft. high, from which issues a flame 3 ft. long. Round the walls of this sanctum are a number of cells in which the priests and Guebres reside. The peninsula is also remarkable for its salt formation: in different parts of it there are 10 salt lakes, only one or two of which are worked, yielding annually about 10,000 tons. There are no trees in this peninsula, but portions of the territory have a layer of mould on which are raised wheat, barley, maize, melons, fruits, rice, cotton, and saffron. Opium is prepared, and a species of red and highly flavored onion not found elsewhere is cultivated. **II.** A seaport town on the W. coast of the Caspian, the capital of the preceding government, in lat. 40° 22′ N. and lon. 49°40′ E., situated on the southern shore of the peninsula of Apsheron; pop. in 1867, 12,383, chiefly Mohammedans. The houses, terraced like those of other oriental towns, are built of naphtha and earth. The town is protected by a double wall built in the time of Peter the Great, has a custom house, military school, 16 Mohammedan private schools, 23 mosques, Russian, Greek, and Armenian churches, and a palace of the ancient khans built about the 7th century, and now used as an artillery arsenal. The walls were once washed by the Caspian, but they are now 15 ft. from it; and in other places the sea has encroached upon the land, and the ruins of submerged buildings are discovered at a depth of 18 ft. The port of Baku is the most important on the Caspian, and a principal Russian naval station. The chief articles of trade are naphtha, iron, silk, shawls, linen and woollen goods, cotton, tobacco, indigo, fruits, fish, salt, and

saffron. There are no factories. Baku existed in the 4th century. It fell into the hands of the Saracens, and after the downfall of the caliphate it passed into the power of the princes of Shirvan. In 1509 it was annexed to the Persian monarchy, and later was taken by the Turks, but recaptured by Shah Abbas I. In 1723 the city capitulated to the Russians under Matushkin, but was returned to the Persians at the peace of 1735. Later it was taken by the inhabitants of the Caucasus, and in 1806 it was again taken by the Russians under Gen. Bulkhakoff and finally annexed to Russia.

BAKUNIN, Mikhail, a Russian revolutionist, born at Torzhok, Tver, in 1814. He belongs to an old family, left the military service for the study of philosophy, and became conspicuous by his affiliations with revolutionary Frenchmen, Germans, and Poles, and as a resolute and reckless agitator. He resided after 1841, when he left Russia, in Germany, France, and Switzerland; and, declining to return to Russia, his estates were confiscated. In 1847 he was expelled from France at the request of the czar for having made an inflammatory speech in favor of a Polish-Russian alliance for the overthrow of Russian despotism. After the revolution of 1848 he was prominent at the Slavic congress in Prague and in the ensuing conflict, after which he fled to Berlin. Expelled from Prussia, he appeared in May, 1849, as a member of the revolutionary government and as the most daring leader of the outbreak in Dresden. Captured at Chemnitz after the suppression of the insurrection, he was incarcerated for eight months in a Saxon fortress. His sentence to death in May, 1850, being commuted to perpetual imprisonment, he was surrendered to the Austrian government, which likewise condemned him to death and commuted the sentence, and which in its turn gave him up to Russia, where he was confined in St. Petersburg and in Schlüsselburg till after the Crimean war, when he was sent to Siberia. He availed himself of a permission to settle in the Amoor Country for escaping to Japan, and reached the United States early in 1861, after which he returned to Europe, lately residing chiefly in Switzerland, still engaged more or less in revolutionary and journalistic enterprises. He is the author of *Russische Zustände* (Leipsic, 1847), and of other publications.

BALAAM (Heb. *Bil'am*), a soothsayer and diviner of Pethor, on "the river" (Euphrates), whom Balak, king of Moab, alarmed at the discomfiture of his neighbors the Amorites by the Hebrews, sent for to pronounce a curse upon the invaders. Balaam refused, saying that he could not curse the people whom God had blessed; but upon being further urged, he agreed to say only what should be commanded by God. He set out, riding upon an ass; but on the way he was met by the angel of the Lord, visible to the ass, but not to the rider. The ass refused to pass the opposing angel, and three times turned out of the way, being each time beaten by Balaam. At last the ass spoke in a human voice, asking why he had been beaten. Then Balaam's eyes were opened, and he saw the angel of the Lord standing with a drawn sword to bar his way. The angel told him to go on to Balak, but he must only say what should be commanded to him. Balaam went to Balak, and after due sacrifices delivered his message, which proved to be a blessing upon the Hebrews, instead of the desired curse. This was repeated four times, with the same result; and on the last occasion Balaam predicted that the Israelites should overthrow Moab, Edom, Amalek, and other neighboring tribes. Some Biblical critics consider the story of Balaam (Numbers xxii.–xxiv.) as an interpolation; other expounders have interpreted the speaking of the ass as a vision or trance in which the diviner thought he saw an angel, and fancied that he heard the ass speaking.

BALAKLAVA, a small seaport town of Russia, in the government of Taurida, on the S. W. coast of the Crimea and a small bay of the Black sea, about 8 m. S. S. E. of Sebastopol; pop. about 750. Known in antiquity as Symbolon Portus, the bay of Balaklava was called in the middle ages Cembalo and Bella Chiava, being a possession of the Genoese, who built a fortress on the heights above the harbor. Catharine II. sent to Balaklava 2,000 Greek and Armenian soldiers as guards of the coast, and their descendants formed from 1795 to 1859 the so-called Balaklava-Greek battalion. In the Crimean war, the British troops under Lord Raglan, a few days after their landing in the peninsula, compelled the small Russian garrison to surrender, Sept. 26, 1854, and established their naval headquarters there, building fortifications and a railway to Sebastopol, and laying a submarine cable to Varna. Balaklava was attacked on Oct. 25 by the Russians, who stormed four redoubts, feebly defended by Turkish troops, and captured 11 guns; but after the repulse of their cavalry by the Highlanders and their defeat by the English heavy brigade, they made no further efforts to advance. The earl of Cardigan, upon an order alleged to have been given by Lord Lucan for the capture of certain Russian guns, led the charge of his light brigade, composed only of about 600 horsemen, against the formidable array of the enemy, his men cutting their way through and back again under the play of the Russian batteries. The survivors of this brilliant but useless exploit did not exceed 150. The first who fell was Capt. Nolan, the officer who conveyed the disputed order from Lord Lucan. The English evacuated the place in June, 1856. Owing to the narrowness of the entrance, the harbor is now used only for the coasting trade with other Crimean ports. On an elevated rock, about 4 m. W. of the town, is the old monastery of St. George, with a new Greek church, and a maritime convent, the inmates of which officiate as priests for sailors. Either the monastery or a neighboring locality



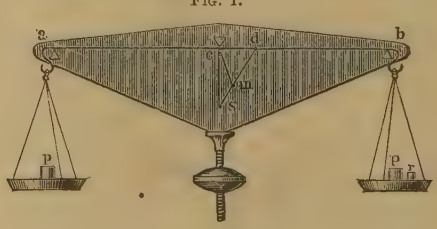
Balaklava.

is supposed to be the site of the celebrated temple of Diana Taurica, of which in the legend Iphigenia was priestess.

BALALAIKA, a musical instrument with two or three strings, played with the fingers like the guitar, very popular in Russia for accompaniments, and found in almost all the cottages of the peasantry. Russian ballads have been collected, under the title of this national instrument, in French (1837) and in German (1863).

BALANCE, an instrument intended to measure different amounts or masses of matter by the determination of their weight, using as standards of comparison certain fixed units, as the gramme, the pound, the ton, &c. The instrument is founded on the law that gravitation acts in a direct ratio to the mass, and on the mechanical principle that when a solid body is suspended on one point, the centre of gravity will place itself always perpendicularly under that point. If therefore a beam, *ab*, fig. 1, is supported in the middle at *c*, and movable around this point, its centre of gravity, *s*, will place itself under the point *c;* and if disturbed from that position, this centre will oscillate like a pendulum, and the beam will finally come to rest only with the centre of gravity in the perpendicular passing through the point of support. It is evident that when the distances from *a* to *c* and from *b* to *c* are equal, the two sides of the beam equal, and the whole made of homogeneous material, the horizontal position will be arrived at, and also when at *a* and *b* equal weights *pp* are suspended; the gravity of such scales and weights must be considered concentrated in the points of suspension *a* and *b*, and their common centre of gravity will be either in, under, or above the point of support, according as the line *ab* uniting them passes through, under, or above the support *c*. But suppose we place an additional weight *r* in one of the scales, then the common centre of gravity of the weights in the scales will be shifted toward the side of that additional weight. Suppose it to be in *d*, then the centre of gravity of the whole balance will be in the line *ds*, uniting the centre of gravity *d* of the

Fig. 1.

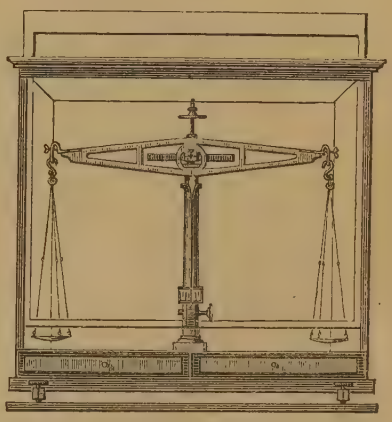


Common Balance.

weights with that of the balance *s;* if then it is somewhere at *m*, it is evident that the balance can no longer maintain the horizontal position, but will only come to rest when *m* is under *c*, or the line *cm* has attained a perpendicular position. It is evident that the angle which the beam in this case makes with a horizontal line is equal to the angle *scm*. If the centre of gravity is in the point of support, the balance is indifferent; that is, it will, when charged with equal weights, remain at rest in any position. And if the centre of gravity is above the point of support, we have a case of so-called unstable equilibrium; the balance will with equal ease tip over to the right or left, and the beam can never be brought into the horizontal position. In either case the balance is useless, and it follows

from this that the centre of gravity must be under the point of support, and the sensitiveness of the instrument depends to a great extent on the distance between these two points. This derived degree of sensitiveness varies with the purposes for which balances are to be used. The most delicate balances are those used for physical and chemical investigation; and in order to secure the greatest possible degree of sensitiveness the conditions are as follows: 1. The centre of gravity of the beam must lie as near as possible under the point of suspension; it is evident that when this centre of gravity s is raised, the point m will be raised also, and the angle scm will become larger, which results in a greater deflection of the beam in case there is no proper equilibrium. Fine balances are provided with an upright rod above their point of suspension, on which a small weight may be screwed up or down, in order to raise or lower the centre of gravity, and so to increase or diminish the delicacy of the instrument. In fig. 1 this rod is represented below, which is only admissible when no great degree of sensitiveness is required, as in this case the centre of gravity is lowered too much. 2. The beam should be as long as compatible with strength. As the distance cd becomes greater in proportion to the length of the arms, any difference in the two weights with which the balance is charged will be the more perceptible the longer the arms are. 3. The beam should also be as light as compatible with strength; the smaller the weight of the balance itself, the greater the influence of minute differences in the load will be to shift the position of the point d from the centre. Therefore the beams of chemical balances are made like an elongated frame, with large openings between, on the same principle as the walking beams of steam engines are constructed. 4. The points of suspension of the two scales must be such that the line uniting them passes exactly through the point of support; if this line passes under that point, the sensitiveness of the balance will diminish too much when the load is increased. This takes place in any case to a small degree, as no beam is so perfectly inelastic that a slight flexion will not take place under the maximum load. 5. The distances of the points of suspension of the scales a and b from the centre c should be perfectly equal; this is best verified by changing the weights in the two scales, when if the equilibrium remains unchanged their distances are equal. Some balances have screw arrangements to correct small differences in this respect. In fig. 2 a chemical balance is represented as used, in a glass case, which serves to protect it not only from dust, but also against air currents which might prevent a truly sensitive balance from ever coming to rest, and thus make correct weighings impossible. The turning point of the beam, in order to reduce the friction to the least amount, is a knife-edge or triangular prism of hardened steel passing at right angles through the beam, and resting when in use upon polished plates of agate (one each side of the beam), which are set exactly upon the same

Fig. 2.



Chemical Balance.

horizontal plane. This knife-edge is polished and brought to an angle of 30°. The points of suspension are also knife-edges, one set across each extremity of the beam. Great care is required that the line connecting them shall be precisely at right angles with the line passing through the centres of motion and of gravity. The index or pointer is sometimes a long needle, its line passing through the centre, and extending either above or below the beam, or it is a needle extended from each extremity of the beam. In either case it vibrates with the motion of the beam over a graduated arc, and rests upon the zero point when the beam is horizontal. The degrees upon each side of the zero of the scale indicate, as the needle oscillates past them, the intermediate point at which this will stop, thus rendering it unnecessary to wait its coming to rest. In order to save the knife-edges from wear, the beam is made, in delicate balances, to rest when not in use upon a forked arm, and the pans upon the floor of the case in which the instrument stands. The agate surfaces, being lifted by means of a cam or lever, raise the beam off its supports and put it in action; or the supports, by a similar contrivance, are let down from the beam, leaving it to rest upon the agate; the pans in the latter case must always remain suspended.—However perfectly a balance may be made, there is always great care to be exercised in its use. Errors are easily made in the estimation of the nice quantities it is used to determine. The sources of some are avoided by a simple and ingenious method of weighing suggested by Borda. The body to be weighed is exactly counterpoised, and then taken out of the pan and replaced by known weights, added till they produce the same effect. A false balance must by this method produce cor-

rect results. The weights employed for delicate balances are either troy grains, one of each of the units, one of each of the tens, and the same of the hundreds and thousands, as also of the tenths, hundredths, and thousandths of a grain; or they are the French gramme weights, with their decimal parts. The latter are the most commonly used in chemical assays and analyses. The larger weights are of brass, the smaller of platinum, and these are always handled by means of a pair of forceps. The beam of the balance is, according to the method introduced by Berzelius, frequently marked by divisional lines into tenths, and one of the small weights, as a tenth or hundredth of a grain, or a milligramme, is bent into the form of a hook, so that it may be moved along the beam to any one of these lines to bring the balance to exact equilibrium. By this arrangement the picking up and trying one weight after another is avoided, and the proportional part of the weight used is that indicated by the decimal number upon the beam at which it rests to produce equilibrium. The best materials for a balance are those which combine strength with lightness, and are least liable to be affected by the atmosphere and acid vapors. Brass, platinum, or steel is used for the beam; but probably aluminum will prove to be better adapted for this purpose than either. The pans are commonly of platinum, made very thin, and suspended by fine platinum wires. The support is a brass pillar secured to the floor of the glass case in which the instrument is kept. Doors are provided in front and at the sides, by which access is had to the instrument; but these are commonly kept closed, and are always shut in delicate weighing, that the beam shall not be disturbed by currents of air. So delicate are the best balances, that when lightly loaded and left to vibrate, they may be affected by the approach of a person to one side of the glass case, the warmth radiated from the body causing the nearest arm of the beam to be slightly expanded and elongated, so as to sensibly preponderate. The degree of sensibility is estimated by the smallest weight in proportion to the load that will cause the beam to be deflected from a horizontal line. It is said that a balance is in possession of Bowdoin college, Maine, which, with a charge of 10 kilogrammes in each scale, is sensitive to $\frac{1}{10}$ of a milligramme. Becker and Sons of New York made the balance; and they make ordinary chemical balances which with one kilogramme in each scale are sensitive to one tenth of a milligramme; their small balances now in use in the assay office, New York, show a difference in load of less than $\frac{1}{100}$ part of a milligramme.—The torsion balance, invented by Coulomb to measure minute electrical forces, is still more delicate than the best beam balance. It consists of a brass wire, hung by one end and stretched by a light weight, carrying at its lower end a horizontal needle. Any force applied to one end of this needle, tending to rotate it horizontally, will be measured by the angle through which it causes the needle to move; that is, by the torsion of the wire. (See Electrometer.)—The steelyard, the Roman *statera*, is one of the forms of the balance, the two arms being of unequal length, the body to be weighed being suspended in a pan or otherwise from the short arm, and the counterpoise, which is a constant weight, being slid along the longer arm until equilibrium is established. As this occurs when the weight on one side multiplied by its distance from the fulcrum is equal to the weight on the other multiplied by its distance from the fulcrum, and as on one side the weight is constant, and on the other the distance from the centre of motion, the unknown weight must be determined by the distance of the constant weight from the centre. —The Danish balance differs from the common steelyard in having the counterpoise fixed at one end, and the fulcrum being slid along the graduated beam. The graduation commences at a point near the counterpoise, at which the beam with the pan suspended at the other end is in equilibrium, and the numbers increase toward the pan. A balance called the bent lever is employed to some extent for purposes not requiring extreme accuracy. The pan is attached to one end of the beam and the other carries a constant weight. From the bent form of the lever this weight is raised to a height varying with the weight placed in the scale pan. A pointer attached to the constant weight and moving along a graduated arc indicates by the number at which it stops the weight of the body in the scale pan. Its indications are the least to be depended upon when the constant weight approaches to the horizontal or vertical line passing through the centre of motion. The scales generally used in the United States for weighing loaded wagons and canal boats are modifications of the steelyard, wherein the weight of these ponderous bodies is divided by means of levers, and a known fraction of it sustained by one end of a beam, the other end of which is graduated for a moving weight. Modern modifications of the steelyard contain a pan hung at the end of the arm to receive larger weights, while the sliding weight is used only to balance the fractional parts.—Spring balances are popular instruments, and consist of a helix of wire enclosed in a cylinder. The body to be weighed is suspended to a wire passing up through the centre of the helix and fastened to the upper coil, which carries a pointer down a narrow slit in the cylinder, thus indicating the weight on the graduated sides of the cylinder.

BALANGUINI, or **Bangingee,** an islet of the Malay archipelago, in the Sulu group, claimed by Spain as part of the province of Zamboangan in the Philippine island of Mindanao, in lat. 5° 57′ 30″ N., lon. 121° 39′ E. It is about 3 m. long and 1 broad, and gives its name to the most daring Malay pirates. In 1848 it was captured by the Spaniards, who had 11 officers and 170 men killed and wounded; 450 of the

pirates were killed, refusing to take quarter. The forts and houses of the island were levelled to the ground, and to make it uninhabitable about 8,000 cocoa palms were cut down.

BALARD, Antoine Jérôme, a French chemist, born in Montpellier, Sept. 30, 1802. He was an apothecary and subsequently professor of pharmacy and chemistry, and acquired celebrity in 1826 by the discovery of bromine in sea water, also by the extraction of sulphate of soda, which increased the supply and lowered the price of potash. He has written on these discoveries and on other subjects in the *Annales de chimie et de physique*, and in the *Mémoires* of the academy. He succeeded Thénard in the chair of chemistry in the faculty of sciences of Paris, and Pelouze in the collége de France in 1851. He became a member of the academy in 1844. In 1868 he was appointed inspector general of superior instruction and honorary professor at the faculty of sciences.

BALARUC, a French watering place, in the department of Hérault, 15 m. S. W. of Montpellier; pop. 600. The springs were known to the Romans, who formed aqueducts and built a temple here. They have a temperature of about 129° F. in summer and 115° in winter, and are recommended for paralysis. A public hospital gives gratuitous relief to the destitute and to soldiers.

BALASORE, a city in the presidency of Bengal and province of Orissa, India, the principal seaport of Cuttack, 120 m. S. W. of Calcutta; pop. about 11,000. It formerly had factories of almost all European nations, but has much declined, the principal trade being limited to imports of the products of the cocoanut and of coir, cowries, tortoise shell, and salted fish from the Maldive islands, in exchange for rice, sugar, and English manufactured goods and hardware. It is provided with dry docks for the accommodation of small vessels at spring tides. Denmark ceded the town to England in 1844.

BALASSA-GYARMATH, a town of Hungary, capital of the county of Nógrád, situated in a delightful region on the Eipel, 42 m. N. of Pesth; pop. in 1870, 6,435. It has an old mountain castle, and carries on considerable trade in oil and wine. In 1626 a peace was concluded here between Austria and Turkey.

BALATON, Lake (Ger. *Plattensee*), a large lake in S. W. Hungary, in the counties of Zala, Veszprém, and Somogy; length, from S. W. to N. E., about 47 m.; greatest breadth 9 m.; depth from 27 to 36 feet; area, about 450 sq. m. It is fed by the river Szala, and discharges its waters through the Sió, which falls into the Sárviz, an affluent of the Danube. The lake abounds in fish. The fogas, a kind of large perch, is found only in this lake; it frequently weighs 10 to 15 and sometimes 20 pounds. There is also a species of white fish resembling the herring, which appears in large shoals during the winter. Crabs, crayfish, tortoises, and mussels are found. Iron sand occurs on the shores, which exhibits under the microscope grains of garnet, ruby, topaz, amethyst, and other precious stones.

BALBI, Adriano, an Italian geographer, born in Venice, April 25, 1782, died there, March 14, 1848. After holding a professorship of geography, sciences, and statistics in Italy, he spent many years in Portugal while preparing several works relating to that country. He subsequently resided in Paris, receiving assistance from the French government, in 1832 went to Padua, and finally to Vienna, where the Austrian government gave him a pension. His principal works are: *Atlas ethnographique du globe* (Paris, 1826), a work of superior arrangement, containing the latest researches of German philologists, and *Abrégé de géographie* (2 vols., 1832), a summary of geographical science, which has been translated into nearly all the European languages (English translation, "Abridgment of Geography," New York, 1835). With La Renaudière and Huot he used to some extent unpublished writings of Malte-Brun in preparing a *Traité élémentaire de géographie* (2 vols., 1830–'31). Among his other publications are: *La monarchie française comparée aux principaux états de l'Europe* (Paris, 1828); *Balance politique du globe* (1828); *L'Empire russe comparée aux principaux états du monde* (1829); "The World compared with the British Empire" (1830). His son, the geographer Eugenio Balbi, has edited a collection of his *Scritti geografici* (5 vols., Turin, 1841–'2).

BALBI, Giovanni de Janua or **Januensis** (from his birthplace, Genoa), a Dominican friar of the 13th century, author of a universal cyclopædia or *Catholicon* (about 1286), which owes its celebrity principally to the fact that it became one of the earliest monuments of the art of printing. The original edition, *Summa Grammaticalis valde Notabilis quæ Catholicon nominatur*, was printed at Mentz by Faust and Schöffer in 1460, and was reprinted at Augsburg in 1469 and 1472, at Nuremberg in 1483, at Venice in 1487, and at Lyons in 1520.

BALBI, Countess de, a favorite of the count de Provence, afterward Louis XVIII., born in 1753, died in Paris about 1836. She was the daughter of the marquis de Caumont de la Force, and was lady in waiting to the countess de Provence, and the wife of the Genoese count de Balbi, who became insane in consequence of her misconduct. The count de Provence continued to lavish vast amounts upon her even after the smallpox had destroyed her beauty. After the outbreak of the revolution she persuaded him to leave France, but he subsequently discarded her, and she was expelled from many capitals on account of her dissipation and intrigues. On her return to France she was exiled to Montauban, where she established a gambling house. She died in obscurity.

BALBINUS, Decimus Cælius, a Roman emperor, slain in A. D. 238. He was a senator, and twice consul, and was elected emperor by the senate in conjunction with Maximus, in opposition to

Maximin—a third emperor, the young Gordianus, being adjoined to them by the clamors of the people and the soldiery. Maximin being killed by his own mutinous soldiers at the siege of Aquileia, Maximus was triumphantly received in Rome; but soon falling out with Balbinus, he depended only for his support upon a body of Germanic barbarians against the prætorians, who disliked both emperors. While the citizens were witnessing the Capitoline games, the two rulers were put to death by the prætorians, who proclaimed the boy Gordianus sole emperor.

BALBO, Cesare, count, an Italian statesman and author, born in Turin, Nov. 21, 1789, died there, June 3, 1853. Through the favor of Napoleon, he was appointed auditor to the French privy council in 1807, afterward secretary to the French commissioners in Tuscany and the Papal States, and in 1812 commissioner of Illyria. After the downfall of Napoleon he was secretary of legation in London until the outbreak of the Sardinian revolution in 1821, when he returned to Turin. He translated Leo's work on the municipal institutions of Lombardy from German into Italian, under the title of *Communi Italiani.* His reputation was firmly established by his *Speranze d'Italia* (1843), in favor of national independence. His *Della storia d'Italia, dall' origine fino al* 1814 (5th edition, Bastia, 1849) was distinguished by the same patriotic spirit and by historical merit. In 1848 he formed the first constitutional cabinet of Charles Albert, which, however, lasted but a few months, and after the Sardinian reverses in the field he exerted great influence as a leader of the moderate party and supporter of D'Azeglio. His biography was published by Ricotti (Florence, 1856), and a monument by Vela has been erected in his honor in Turin.

BALBOA, Vasco Nuñez de, a Spanish American discoverer, born at Xeres de los Caballeros, Estremadura, in 1475, beheaded at Castilla de Oro, Darien, in 1517. He was a nobleman who escaped from his creditors to Hispaniola, and subsequently joined Enciso's Darien expedition. Quarrels between rival commanders made him chief of the new settlement. His humane policy reconciled the Indians, and while engaged in exploring the isthmus he reached the summit of a mountain from which he discovered the Pacific, Sept. 26, 1513. He erected a cross on the spot, and took possession of the whole region for Spain. But before the news of this important discovery reached Madrid Enciso's intrigues had resulted in Balboa's displacement by Davila, who soon lost the advantages gained by his predecessor. The Spanish government, at length enlightened in regard to the great achievements of Balboa, named him deputy governor; but Davila opposing his installation, he went in search of new settlements. This exasperated Davila still more, but his wrath was for a time appeased by the intercession of influential personages, and he even gave his daughter in marriage to Balboa. The continued success of the latter, however, revived his jealousy, and he seized a pretext for charging him with treason, and subjecting him to a mock trial. Balboa and four of his friends were executed, he protesting to the last his innocence and his loyalty.

BALBRIGGAN, a town of Ireland in the county and 18 m. N. N. E. of Dublin; pop. about 2,500. It is the seat of thriving manufactures of cotton goods and hosiery. The cotton stockings made here are remarkable for the fineness of their texture; many females are also employed in embroidering muslins. In 1780 Baron Hamilton, with the help of the Irish parliament, established cotton works here, and built a pier, to which an inner dock was afterward added by a member of the same family. The railroad crosses the harbor by a viaduct of 11 arches of 30 ft. span. Balbriggan is a favorite watering place.

BALBUENA, Bernardo de, a Spanish poet and prelate, born at Val de Peñas in 1568, died in Porto Rico in 1627. He was educated in Mexico, became provost in Jamaica, and in 1620 bishop of Porto Rico. He wrote *El siglo de oro* ("The Age of Gold"), a pastoral romance, the scene of which is laid in the new world; *La grandeza Mejicana* (new edition, 1821); and *El Bernardo* (3 vols., Madrid, 1624; new ed., 3 vols. 8vo, 1808), an epic which is among his most finished productions.

BALBUS. I. Lucius Cornelius (Major), a Roman consul, born in Gades (Cadiz) in the 1st century B. C. He served in the Sertorian war, after which Roman citizenship was conferred on his family. Shortly afterward he removed to Rome. He accompanied Cæsar into Spain in 61, and into Gaul in 58, and was appointed *præfectus fabrum* to his legions. During the Gallic wars he spent much time at Rome, where he managed Cæsar's private property, and acted as agent for the sale of spoils taken from the enemy. In 56 his foes and those of the triumvirs charged him with having assumed illegally the privileges of a Roman citizen; but he won the trial, owing to his defence by Pompey, Crassus, and especially by Cicero. Balbus did not bear arms against the Pompeians in the civil wars, but remained at Rome working in the interest of Cæsar, and finally succeeding in gaining Cicero for the dictator's cause. On the assassination of Cæsar Balbus retired to his country seat, where he remained until the arrival of Octavius in Italy. He then hastened to Naples to meet the latter, whom he accompanied to Rome, and who appointed him ædile, prætor, and in 40 consul, he being supposed to have been the first adopted citizen who filled that office. In his will he bequeathed 20 denarii to every Roman citizen. He wrote a diary of the most eventful occurrences in his own and Cæsar's life, and provided for the continuation of the "Commentaries on the Gallic War." Four of his letters to Cicero are extant. **II. Lucius Cornelius**

(Minor), a nephew of the preceding, born in Gades. After the outbreak of the civil war he made ineffectual attempts to detach the consul L. Cornelius Lentulus, an intimate friend of his family, from his allegiance to Pompey. Balbus attended Cæsar throughout all the campaigns of this period, and after their termination was appointed pontiff. While quæstor to Asinius Pollio in Further Spain in 44 and 43 B. C. he greatly enlarged and improved his native city. But his quæstorship was marked by fraud and oppression, and he ultimately fled to Africa (43), and 20 years afterward reappeared as proconsul of Africa. While holding this office he gained a victory over the Garamantes, which procured him the honor of a triumph in Rome, the first ever enjoyed by an adopted citizen. Balbus, like his uncle, amassed a large fortune. He built a theatre at Rome, and was a favorite of Augustus. **III. Quintus Lucilius,** a Roman philosopher, of the earlier half of the 1st century B. C., whom Cicero compared to the best Greek philosophers, and made the expositor of stoical opinions in his dialogue *De Natura Deorum*. **IV. Lucius Octavius,** a Roman jurist, probably brother of the preceding, and one of those who were executed by order of the triumvirs Octavius, Antony, and Lepidus. **V. Titus Ampius,** a Roman tribune, who in 63 B. C. sought to obtain for Pompey the honor of wearing a laurel crown and all the insignia of a triumph at the Circensian and other games, in consideration of his Asiatic victories. He was next an unsuccessful candidate for the ædileship, though sustained by Pompey. In 59 he was prætor, and in 58 governor of Cilicia. On the outbreak of the civil war he joined the Pompeians. After the overthrow of his party at Pharsalia he was banished, but the mediation of Cicero put an end to his exile. He wrote a work on contemporary events, an extract of which is given in Suetonius.

BALDE, Jakob, a German Latin poet, born at Ensisheim, Alsace, in 1603, died at Neuburg, in the Palatinate, Aug. 9, 1668. He was a professor of literature, joined the society of Jesus, and became chaplain of the elector of Bavaria. His complete works, including lyrical and other Latin poems, were published in Munich in 8 vols., 1729. He has been called the German Horace, and Herder translated several of his compositions. New editions of his *Carmina Lyrica* and *Batrachomyomachia* appeared at Münster in 1856–'9, the latter with a German version.

BALDI, Bernardino, an Italian scholar, born in Urbino, June 6, 1553, died there, Oct. 12, 1617. He was a fellow student with Tasso, and became an intimate friend of St. Charles Borromeo, and was in possession of the rich abbey of Guastalla from 1586 to 1611. He was familiar with 16 languages, and the author of about 100 miscellaneous works on mathematics, geography, history, &c., and commentaries and translations. His sonnets and his didactic poem in blank verse, *La Nautica* (1590; French version in prose, Paris, 1840), are among the finest productions of his day. He prepared a translation of the Chaldaic Targum of Onkelos, Arabic and Persian grammars, and Turkish, Hungarian, and Arabic dictionaries.

BALDUR, or **Balder,** in northern mythology, the son of Odin and Frigga, and the most beautiful and beloved of the gods of Odin's race. He was the husband of Nanna and the father of Forseti. His home was in Breidablik, the most beautiful part of Asgard, the northern Olympus. Baldur having long been troubled by dreams and evil omens, indicating danger to his life, his mother travelled through the whole universe, eliciting from every created thing a promise not to injure the god. She only neglected to ask this from the mistletoe, which seemed to her entirely harmless. Loki, the most deceitful among the gods, and an enemy of Baldur, remarked this omission, and cut from the mistletoe a piece for the point of a dart. The other gods, surrounding Baldur, made proof of his invulnerability, in sport, by casting at him their weapons, with stones and clubs of wood; but nothing injured him. Then Loki approached and induced the blind god Hodur to throw the dart he had made from the forgotten mistletoe. Baldur was pierced by it and killed. The gods, lamenting his loss, sent his brother Hermodur to Hel, the under world, to ask upon what condition the goddess of the dead would release him. The reply was that he could only be spared if everything in the world would weep for him. All consented except Loki, who had disguised himself as a giantess. The gods then celebrated Baldur's funeral with the greatest pomp. His body was carried to the seashore and burned on his great ship Hinghorni, which was lifted out of the sea by the aid of the giantess Hirrokin. Nanna died of grief, and her body was burned with his. By the ancient Germans Baldur was worshipped as the god of peace; other northern nations seem also to have imagined him as a deity similar to the Greek Apollo.

BALDWIN. I. A central county of Georgia, bounded N. by Little river, and intersected by the Oconee; area, 257 sq. m.; pop. in 1870, 10,618, of whom 6,774 were colored. The surface is diversified. The river bottoms are highly fertile, but much of the land in other places is nearly worn out. The Milledgeville branch of the Georgia Central railroad and the Macon and Augusta railroad pass through the county. The chief productions in 1870 were 3,553 bushels of wheat, 89,857 of Indian corn, 18,285 of sweet potatoes, and 4,036 bales of cotton. Capital, Milledgeville. **II.** A S. county of Alabama, separated on the E. from Florida by the Perdido river and bay, bounded S. by the gulf of Mexico and W. by Mobile bay and the Mobile and Alabama rivers, and intersected by the Tensaw river; area, about 1,500 sq. m.; pop. in 1870, 6,004, of whom 2,845 were colored. The Mobile and Montgomery railroad passes through

the county. The surface is level or moderately uneven. The soil is sandy and unproductive, but supports a valuable growth of pine timber. The chief productions in 1870 were 31,025 bushels of Indian corn, 19,411 of sweet potatoes, 87 bales of cotton, and 9,864 lbs. of wool. Capital, Blakely.

BALDWIN (Fr. *Baudouin* or *Balduin*), the name of several counts of Flanders.—**Baldwin I.**, surnamed Iron-Arm, was a son-in-law of Charles the Bald, king of France, and died in 879.—**Baldwin II.**, the Bald, son of the preceding, died in 918. He waged war against the kings of France, Eudes and Charles the Simple.—**Baldwin IV.**, the Bearded, died in 1036. He increased his family domain by several conquests, especially that of Valenciennes, and received from the emperor Henry II. the island of Walcheren.—**Baldwin V.**, of Lille, the Débonnaire, son of the preceding and son-in-law of King Robert of France, died in 1067. He conquered Hainault, was regent of France during the minority of his nephew Philip I., and helped William of Normandy, his son-in-law, in the conquest of England.—**Baldwin VIII.** died in 1195. He was an enemy of Philip Augustus, but became reconciled and swore allegiance to him in 1192.—**Baldwin IX.**, son of the preceding. See Baldwin I. of Constantinople.

BALDWIN, the name of two emperors of Constantinople.—**Baldwin I.** (the ninth Flemish count of that name), born in Valenciennes in 1171, died in 1205 or 1206. He brought to a close a war with Philip Augustus, appointed his uncle William, his brother Philip, and Bouchard d'Avesnes regents of Flanders, took holy orders in Brussels in 1200 or 1201, and joined the crusaders, together with his brother Thierry. Subsequently he coöperated with the Venetians under Dandolo, and with the connivance of Alexis, son of the deposed Byzantine emperor Isaac, in the capture of Constantinople, when he was crowned as emperor, May 16, 1204. His power was only nominal, the crusaders dividing the Byzantine provinces among their other leaders. Baldwin delivered Thrace from the Turkish invaders, but the Greeks having invoked the assistance of the Bulgarians against him, he was captured April 14, 1205, near Adrianople, and subjected to tortures from which he died. Some accounts, however, leave it doubtful whether he fell in battle or died in prison.—**Baldwin II.**, last Latin emperor of Constantinople, born in 1217, died in 1273. He was a son of Peter de Courtenay, succeeded his brother Robert in 1228, and, though aided by the pope and King Louis IX., was finally driven from Constantinople by Michael Palæologus, who gained possession of the city by stratagem in July, 1261. Baldwin fled in disguise to the island of Negropont, and from thence to Italy, where he died in obscurity.

BALDWIN, the name of five kings of Jerusalem.—**Baldwin I.**, born in 1058, died in 1118. He was a descendant of the fifth count of Flanders, and joined his brother Godfrey de Bouillon in the first crusade. He quarrelled with Tancred and other crusaders, retired to Edessa, where he was elected count, and in 1100, after the death of Godfrey, was chosen to the throne of Jerusalem. In 1102, after commanding in the disastrous battle of Rama, he was besieged in Jaffa by the Saracens, but put them to flight. The next year he was repulsed before St. Jean d'Acre (Ptolemais), but he captured it with the aid of the Genoese in 1104, after a 20 days' siege. In 1109 he took Berytus (Beyrout) after a siege of 75 days, and in 1110 Sidon (Saida). He fell ill during an expedition to Egypt and died on his homeward journey to Jerusalem. His intestines were buried in a place which is called the sepulchre of Baldwin, and the rest of his remains were interred in Jerusalem by the side of his brother.—**Baldwin II.**, surnamed Du Bourg, died Aug. 21, 1131. He was the son of Hugh, count of Rethel, and a cousin of the preceding, whom he succeeded as ruler of Edessa in 1100. In 1118 he was crowned king of Jerusalem, and in 1119 relieved Antioch from the Moslems. In February, 1124, while attempting to rescue Jocelin, count of Edessa, and Galeran, his relative, he was captured, and ransomed in August together with Jocelin, Tyre having been conquered during his absence by the regent Eustache Garnier. After his return to Jerusalem Baldwin made an ineffectual attempt to take Aleppo, but he succeeded in other military exploits, and considerably extended the boundaries of his kingdom. The order of the templars was sanctioned by the Roman see under his reign. He was one of the bravest knights of his day, and remarkable both for his valor and his piety. He was succeeded by his son-in-law Fulk of Anjou.—**Baldwin III.**, grandson of the preceding, born about 1130, died Feb. 23, 1162. He succeeded his father Fulk in 1143, under the guardianship of his mother Melisanda. In 1148 he joined the emperor Conrad and Louis VII. of France in the siege of Damascus. After the failure of this enterprise, he restored and fortified the ancient town of Gaza; and in 1153 he captured Ascalon after a siege of seven months, and made his brother Amaury its ruler. In 1159 he took Cæsarea, which he gave to Renaud, prince of Antioch. He secured the alliance of the Greek emperor Manuel by marrying his daughter Theodora, but died childless, and was succeeded by his brother Amaury. He was regarded as a model knight.—**Baldwin IV.**, nephew of the preceding, born in 1160, succeeded his father Amaury in 1173, died March 11, 1186. It was in his reign that Saladin assumed the title of sultan, and began his warfare with the Franks of Palestine, narrowly missing the capture of Baldwin near Sidon in 1178, but being defeated in 1182 near Tiberias. Attacked with leprosy in 1183, Baldwin caused his nephew, the son of his sister Sibyl by her first marriage with Count William of Montferrat, to be crowned as **Baldwin V.**, and at the same time chose Guy de Lusignan as second

husband of his sister and regent during Baldwin's minority. Guy, however, was soon displaced at the demand of the barons, and retired to Ascalon, where he defied a weak effort of Baldwin to bring him to trial. Baldwin IV. died while an embassy from his court was on the way to Europe to invoke assistance against Saladin. Baldwin V. was supposed to have been poisoned by his mother (1186) in order to secure the crown for Lusignan, who accordingly succeeded.

BALDWIN, John Dennison, an American journalist and archæologist, born at North Stonington, Conn., Sept. 28, 1809. At the age of 14 he was thrown entirely upon his own exertions. He fitted himself in the common school and at an academy to enter college. Not being able to pursue a collegiate course, he began the study of law, but soon abandoned it for theology, and while pursuing his theological studies at the divinity school in New Haven went through the course pursued by the freshman, sophomore, and junior classes in Yale college, from which he received the honorary degree of A. M. In 1833 he was licensed to preach, and was settled at North Branford, Conn., where he remained seven or eight years. He acquired the French and German languages, and by 1844 had begun to give special attention to archæology and its bearing upon the current schemes of ancient history. He also wrote much for magazines and newspapers, and became editor of the "Charter Oak," an anti-slavery newspaper published in Hartford, and afterward of the "Commonwealth," published in Boston. In 1859 he became editor and proprietor of the "Worcester Spy," one of the oldest journals in New England. In 1863 he was elected to congress, and was twice reëlected. In 1847 he published "Raymond Hill," a small volume of poems. While a member of congress he continued his archæological studies, and in 1869 published a work on "Prehistoric Nations," and in 1872 one on "Ancient America."

BALEARIC ISLANDS, a group of islands in the Mediterranean, the principal of which are Majorca, Minorca, and the penal settlement of Cabrera, forming a province of Spain, situated opposite that of Valencia, between lat. 39° 6′ and 40° 5′ N. and lon. 2° 20′ and 4° 21′ E.; area, 1,860 sq. m.; pop. in 1867, 284,398. Formerly the islands of Iviza and Formentera, lying between Majorca and the mainland, were generally considered a part of this group. Both Majorca and Minorca are mountainous, the highest mountain rising over 5,000 feet above the sea. The climate is delightful, and the soil extremely fertile, but agriculture and cattle-breeding are neglected, despite of fine pasture. Sheep and hogs are very large, however, and mules and asses are reared for exportation. The principal products are olives, oranges, figs, and other fruits, red and white wine, and saffron. The exports comprise these articles as well as oil, brandy, home-made palm brooms, baskets, and wooden wares. The trade is chiefly carried on in Majorca and Minorca. The inhabitants resemble the Catalans. The language of the common people is a corrupt Catalan dialect mixed with words from various eastern languages. The islands were known to the Greeks and Romans under their present name, which they derived from *βάλλειν*, to throw, in reference to the great skill of the inhabitants as slingers. Early settlements were made by the Phœnicians and Carthaginians. During the Punic wars the islanders served as slingers in the armies of both Carthage and Rome. Subsequently their piracies caused them to be subdued by the Romans under Q. C. Metellus (123 B. C.), hence surnamed Balearicus. They successively fell into the hands of the Vandals, the Visigoths, and the Moors; were held by Charlemagne six years, and retaken by the Moors, who were not expelled till the 13th century. Conquered by James I. of Aragon in 1229, they formed after his death, for about 70 years, a part of the kingdom of Majorca, and in 1343 reverted to Aragon.

BALÉCHON, Jean Jacques Nicolas, a French engraver, born at Arles in 1715, died in Avignon, Aug. 18, 1765. His finest work is the full-length portrait of Augustus III., king of Poland, after Rigaud, in the Dresden gallery. Among his works were three fine plates after Claude Vernet, and one of Ste. Geneviève, after Vanloo.

BALEN, Hendrik van, a Flemish painter, born in Antwerp in 1560, died there in 1632. He was a pupil of Adam von Oort, the teacher of Rubens, perfected his art in Italy, and became the instructor of Vandyke and Snyders, and the first of Flemish painters who succeeded in purity of coloring. His cabinet pictures, chiefly classical subjects, with landscapes by Jan Breughel and Kierings, enjoyed great popularity. Altar pieces of his are in the Antwerp cathedral.

BALESTRA, Antonio, an Italian painter, born in Verona in 1666, died April 2, 1740, or according to some accounts in 1734 or 1744. He left commerce for art, studied in Venice, Bologna, Rome, and Naples, and became a member of the academy of St. Luke in Rome, which conferred a prize upon his "Defeat of the Giants." In 1695 he removed to Venice, and afterward to Verona. He was one of the last great representatives of the Venetian school. He engraved in aquatint, and must not be confounded with the copperplate engraver Giovanni Balestra.

BALFE, Michael William, an Irish composer, born in Dublin, May 15, 1808, died in London, Oct. 20, 1870. When eight years old he played a concerto on the violin at a public concert. At the age of nine he wrote the ballad called "The Lover's Mistake," effectively introduced into the play of "Paul Pry" by Mme. Vestris. He lost his father in 1823, and went to London with Mr. Charles Horn, the composer, as an articled pupil for seven years. He was soon engaged as principal violinist at the Drury

Lane oratorios, and in the Drury Lane orchestra, under Thomas Cooke. In 1825 he went on the stage. His voice, which he had cultivated, was a rich baritone, but he utterly failed from timidity as Casper in *Der Freischütz*, at the Norwich theatre. Immediately afterward Count Mazzara, who fancied that he resembled a son whom his wife had lost, took young Balfe with him to Rome, where the countess received him very tenderly. Here he remained for a year, studying under the best masters. After this, still through the bounty of Count Mazzara, he had similar advantages at Milan, where his first production of any pretension, a ballet called *La Peyrouse*, was performed with great success. Passing on to Paris, where Rossini held out hopes of an engagement at the Italian opera, he applied himself to study for several months, and at last appeared as Figaro in the "Barber of Seville," with Sontag as Rosina. His career as a dramatic singer was triumphant, in Italy as well as in France, after this. He sang in New York in 1834, and in 1835 returned to London, accompanied by his wife, who had been Mlle. Lina Rézer, prima donna of the troupe in Sicily. He sang at the ancient and philharmonic concerts in London, and appeared at Drury Lane in his "Siege of Rochelle," "The Jewess," and *Chiara de Rosenberg*. The "Maid of Artois," written for Mme. Malibran, and in which she won one of her greatest triumphs, came next. A variety of operas, among which "Falstaff" deserves particular mention, followed, and most of them were popular. In 1839 Mr. Balfe became manager of the English opera house, but did not succeed. His "Bohemian Girl," the most popular and one of the best of all his works, filled the treasury at Drury Lane, and is still a favorite in England and the United States. Toward the close of Mr. Balfe's life it was successfully produced in Paris under the composer's direction. "The Daughter of St. Mark," "The Enchantress," "The Bondman," "The Rose of Castile," "The Puritan's Daughter," "Satanella" (1858), and other operas were subsequently produced, and many of them were represented with great success in Germany.—In the spring of 1857 his daughter, Miss Victoria Balfe, appeared on the stage in London as a vocalist. In 1860 she married Sir John Crampton, from whom she was divorced in 1863; and in 1864 she married the Spanish duke de Frias. She died in Madrid, Jan. 21, 1871.

BALFOUR, Alexander, a Scottish author, born in the parish of Monikee, Forfarshire, March 1, 1767, died Sept. 18, 1829. He was apprenticed to a weaver, failed in business in London (1815), and eventually became a clerk of the Messrs. Blackwood in Edinburgh. Mr. Canning obtained for him a grant of £100 from the national treasury. He wrote "Campbell, or the Scottish Probationer" (1819); "The Foundling of Glenthorn, or the Smuggler's Cave" (1823); and "Highland Mary." He edited the poems of his friend Richard Gall, and contributed to the "Edinburgh Review." D. M. Moir published a posthumous selection from his writings under the title of "Weeds and Wild Flowers," with a biographical notice.

BALFOUR, Sir James, a Scottish jurist and politician, born in Fifeshire early in the 16th century, died about 1583. He was educated for the Roman Catholic church, but joined the Protestants, took part in the conspiracy against Cardinal Beaton, was made prisoner at the surrender of the castle of St. Andrews, and with Knox, who called him the blasphemous Balfour, was imprisoned in the French galleys. He escaped in 1550, again changed his religion, attached himself to Bothwell's fortunes, was made privy councillor, and received many other appointments, including the governorship of Edinburgh castle. He was present at the murder of Rizzio, and accused of complicity in the death of Darnley. He gave up to the confederate lords the celebrated letters intrusted to him for safe keeping by Bothwell, on which it was attempted to establish Mary's guilt. Murray afterward made him president of the court of session, and Morton employed him with Skene in compiling the revision of the Scottish statutes, known as "The Prackticks." One of his last acts was compassing Morton's death by furnishing the deed signed by him at the time of the assassination of Darnley.

BALFOUR, Walter, an American clergyman, born in the parish of St. Ninians, Stirlingshire, Scotland, about 1776, died in Charlestown, Mass., Jan. 3, 1852. He was educated for the ministry of the church of Scotland, and after preaching a few years emigrated to America. He was still in the faith of the Scottish kirk, but at the age of 30 became a Baptist. A few years later some circumstances, among which he always reckoned the letters of Prof. Stuart of Andover to the Rev. W. E. Channing, written in 1819, led him to think of the doctrines of Universalism, and finally to embrace them. In 1823 he avowed his opinions, and was from that time a laborious writer and preacher in support of the doctrines he then espoused.

BALFRUSH, or Balfurush, a town of Persia, in the province of Mazanderan, situated on the river Bahbul, here crossed by a bridge of 9 arches, about 12 m. from the southern shore of the Caspian sea, and about 100 m. N. E. of Teheran; pop. about 60,000. It is situated in a swampy but fertile country, in the midst of tall trees. It formerly had an extensive trade with Russia, and many fine bazaars and colleges, but has much declined owing to the ravages of the plague and the cholera, and the unhealthy climate.

BALI, or Little Java, an island of the Malay archipelago, the westernmost of the Little Sunda islands, situated between Java and Lombok, 70 m. long by 35 m. average breadth; area about 2,200 sq. m.; pop. about 600,000. The geology resembles that of Java, from which it is separated by a narrow strait. The island is traversed E. and W. by mountain ranges, which

terminate in a volcanic peak over 11,000 ft. high. The eruption in 1815 of another volcano, Gunung Batur, 7,000 ft. high, caused great loss of life. The coast is rugged, and has few harbors. The land is productive, and abundantly watered. The chief products in the south are grain and sweet potatoes, and in the north rice. The imports are opium, betel, ivory, gold, and silver; and the exports include hides, oil, edible birds' nests, and other articles. The natives are skilful artificers in gold and iron, and manufacture firearms. They are supposed to be descended from Hindoo colonists of Java, and are with those of Lombok the only people in the archipelago who observe Hindoo rites. The Kavi is the religious language, and the Sunda is spoken by the masses. Widows are killed by their nearest relatives, and their bodies burned. Among the nobles the practice of burning the dead also prevails to some extent. Many of the higher classes are fond of letters, and have large collections of MSS., chiefly translations from Javanese and Malay. There are in the island about 4,000 Mohammedans and 8,000 Chinese. The island was divided in 1815 into nine principalities or rajahships, the village administration being about the same as in Java. The prince of Klongkong has a theocratic supremacy over all the islands by virtue of his reputed descent from Deva Agung, the deified progenitor of the Balinese. The most powerful of all the principalities is Karang Assam, in the northeast, which is dynastically united with the neighboring island of Lombok. The Dutch in 1846 resented an alleged insult to one of their diplomatic agents by capturing the chief fortress, Baliling, and extorting a treaty, the violation of which led to a new expedition in 1847, in which they were defeated with considerable loss. Subsequent expeditions were more successful, both in checking the Bali pirates and inducing the ruling princes to make important concessions. The Dutch have a settlement at Badong on the S. coast.

BALIOL. See BALLIOL.

BALIZE, or **Belize,** a town of British Honduras, Central America, at the mouth of the river of the same name, in lat. 17° 29′ N., lon. 88° 8′ W.; pop. about 12,000, many of whom are negroes. It is built along a single street running parallel with the seashore; from this extend only a few inconsiderable side streets, almost every house in the town facing the main thoroughfare. The principal buildings are the market (an iron structure), the government savings bank, a hospital and an insane asylum, and several churches. There are also numerous schools. The trade of Balize is considerable; cochineal and mahogany are the leading articles of export. Balize was first settled by the English about 1670; and after numerous contests with the Spaniards, who claimed possession of the site, it was finally confirmed to the British by the treaty of 1783. It is the seat of the legislature of British Honduras.

BALKAN MOUNTAINS, an extensive range bounding the great plains of Bulgaria S. of the lower Danube. The true Balkan, or ancient Hæmus, commences on the Black sea at Cape Emineh or Hæmus, lat. 42° 43′, and, after making a curve to the north, runs W. S. W. to the sources of the Maritza, the ancient Hebrus, comprising about four degrees of longitude, dividing Bulgaria from Roumelia or Thrace. Here it is intersected at an acute angle by a range running N. W. and S. E. from Roumelia into Servia, and called by the ancients Rhodope and Scomius, by moderns Despoto Dagh and Dupansha Dagh. Further west, after making a sharp curve toward the southern frontier of Servia, it becomes the Mount Orbelus of the ancients. Between Servia and Albania it is the Mons Scardus, or Kara Dagh, and thence crosses Albania, joining the Dinaric Alps and approaching the Adriatic sea. The offshoots of the Balkan both N. and S. are very numerous, extending toward the Carpathians on one side, and the mountains of Macedonia on the other. The average elevation of these mountains is about 4,000 ft. The loftiest peaks rise about 4,000 ft. higher. The Balkan is the natural northern defence of Turkey. It has a number of passes, the principal of which is that of Shumla, by which the Russians under General Diebitsch effected a passage in 1829. Some of the rivers which take their rise in the Balkan are of considerable importance. Those which flow from the northern watershed are tributaries to the Danube, with the exception of a few which run into the Black sea. On the south the Maritza and its tributaries flow into the Ægean sea. From the western range the Morava (Margus) and the Drina (Drinus) flow north through Servia from Mount Orbelus. On the south the Mesta or Kara Su (Nestus), Struma (Strymon), and Vardar (Axius) carry off the waters into the gulfs of Contessa and Salonica. The mountains are principally of granitic formation. Marble is abundant in the southern ranges. Gold and silver were found by the ancients. Copper, iron, and lead mines also exist.

BALKASH, Balkhash, or **Tengiz,** a lake of S. W. Siberia, between lat. 44° and 47° N., and lon. 74° and 79° E.; length from N. E. to S. W., 250 m.; greatest breadth, 70 m.; area about 8,000 sq. m. It has no visible outlet. It is enclosed by mountains on the E. and W. On the S. and S. W. it receives the Ili, whose valley was a century ago the principal domain of the Dzungaris. They were nearly annihilated by the Chinese, who introduced various settlers for the cultivation of the soil. The lake is frozen during winter. It contains only small fish. The Russian government has attempted to navigate part of the Ili since 1852.

BALKH. I. A country of central Asia, the main part of ancient Bactria, situated between lat. 35° and 37° N., and lon. 63° and 69° E., bounded N. by the Oxus, E. by Badakhshan, W. by the desert, and S. by the Hindoo Koosh

and its western continuation; area, nearly 30,000 sq. m.; pop. about 1,000,000, chiefly Uzbecks. The southern part is rocky, but has many fine valleys; the eastern is mountainous, but less barren than the western and northern parts. Its inhabitants comprise both peaceful and warlike tribes. Many are engaged in the caravan trade between Russia, China, and India; others are mechanics and agriculturists. Balkh formerly included Koondooz, Khooloom, and other districts which have now become separate governments. It formed part of Cabool, and after the fall of the Durrani dynasty came into the hands of the ruler of Bokhara. In 1850 it was conquered by Dost Mohammed, and the widow of Feis Mohammed of Balkh furnished in 1867 funds to Shere Ali for gathering a considerable army. In 1871 a treaty was concluded which fixed the upper Oxus as a boundary line between Afghanistan and Bokhara, Balkh belonging again to the latter government, though in an unsettled condition and virtually ruled by Russian influence. **II.** A city (anc. *Bactra*), capital of the preceding country, in lat. 36° 48′ N., lon. 67° 18′ E., on the Balkh or Dehaz river, a tributary of the Oxus, 250 m. S. E. of Bokhara and 180 m. N. W. of Cabool; pop. about 2,000. Its origin is associated with Kaimurs, the mythical founder of a Persian dynasty, and it flourished as the capital of a Greek kingdom under the successors of Alexander the Great. (See BACTRIA.) Devastated by Genghis Khan, Tamerlane, Nadir Shah, and others, and deprived of most of its former commerce since the discovery of the Cape of Good Hope, it has lost its splendor, traces of which, however, linger in ruins extending over 20 m., and it is still called by the natives the mother of cities.

BALL, Game of. See BASE BALL.

BALL, John, an English fanatical preacher in the reign of Richard II., executed at Coventry in 1381. He was a priest who had been repeatedly excommunicated for preaching "errors and schisms, and scandals against the pope, the archbishops, bishops, and clergy;" and when Wycliffe began to preach he adopted some of that reformer's doctrines and engrafted them on his own. He joined Wat Tyler's rebellion in 1381, and at Blackheath preached to a hundred thousand of the insurgents a violent democratic sermon on the text,

> When Adam delved and Eve span,
> Who was then the gentleman?

His sermons and letters contributed greatly to spread the insurrection. After the death of Wat he was seized with others of the leaders and either beheaded or hanged.

BALL, Thomas, an American sculptor, born in Charlestown, Mass., June 3, 1819. He was originally a portrait painter in Boston, but about 1852 began to devote himself exclusively to modelling. His first production in the plastic art was a miniature bust of Jenny Lind, which was soon followed by a life-size bust of Daniel Webster, esteemed an excellent likeness. After executing a life-size statue of the same statesman he passed several years in Europe, and upon his return to Boston received a commission for an equestrian statue of Washington, which was cast in bronze by the Ames manufacturing company at Chicopee, Mass., and placed in the public garden of Boston in 1868. He revisited Europe in 1865, passing some time in Rome and Florence. His remaining works include a bust of Rufus Choate, statuettes of Webster, Lincoln, and Clay, a life-size statue of Edward Everett (in the Boston public library), a statue of Edwin Forrest in the character of Coriolanus, one of Eve, and a number of ideal busts and statues. In 1871 his statue of Gov. Andrew of Massachusetts was placed in the state house at Boston.

BALLANCHE, Pierre Simon, a French writer and philosopher, born in Lyons in 1776, died in Paris, June 12, 1847. He first followed the trade of his father, who was a bookseller and a printer. In 1801 he published *Du sentiment considéré dans ses rapports avec la littérature et les arts.* In 1814 appeared his historical novel *Antigone*, and subsequently an *Essai sur les institutions sociales dans leurs rapports avec les idées nouvelles*, in which he sought to reconcile national tradition with the progressive law of modern society. These works made little impression upon the general public; but his *L'homme sans nom* (1820), a novel which bitterly denounced some old revolutionary leaders, was more successful. After this publication Ballanche, who had previously removed to Paris, devoted himself to purely speculative studies. In spite of their abstruseness, his subsequent works were eagerly sought for. In *Orphée* he symbolically expounded the way in which every great social evolution must be accomplished. The *Prolégomènes*, which serve as an introduction to *Orphée*, and his great work *Palingénésie sociale*, contain a full exposition of his prophetic and mystical theories. These theories are summed up, though not made more intelligible, in *La vision d'Hébal, chef d'un clan écossais*, which was his last publication. He was much respected by Chateaubriand and Mme. Récamier.

BALLANTYNE. I. James, a Scottish printer, born at Kelso in 1772, died in Edinburgh, Jan. 17, 1833. He was a schoolfellow of Walter Scott at Kelso grammar school. In 1795 he began practice as a solicitor in his native town, and the next year started a weekly journal called the "Kelso Mail," to which Scott contributed. By the advice of the novelist he removed to Edinburgh, to carry on the printing business. The first volumes issued from what he called the "Border Press" were the first and second of Scott's "Minstrelsy of the Scottish Border," brought out in a manner greatly superior to any Scotch printing of that time. The third volume followed in 1803. From that time he printed all of Scott's works, and the Ballantyne press attained a high reputation. From

1805, when the "Lay of the Last Minstrel" was published, to his failure in 1826, Scott was a secret partner with Ballantyne, not only in the printing business, but in the proprietorship of the "Edinburgh Weekly Journal," which Ballantyne conducted with spirit and success. Ballantyne was in the secret of the authorship of "Waverley," and was almost the only person to whose criticism and suggestions Scott paid any attention. For many years he printed "Blackwood's Magazine;" and in 1822 145,000 volumes of Scott's works were issued from Ballantyne's press. Unfortunately, Scott also became principal in a publishing house of which John Ballantyne was the ostensible head. After struggling for some years, with heavy losses, this concern was broken up, and the Ballantynes shared in Scott's misfortunes. Wilson described James Ballantyne as "the best declaimer extant," and Lockhart said he was one of the best readers he ever heard. He was considered for 25 years the best theatrical orator in Scotland. **II. John,** brother of the preceding, born at Kelso about 1774, died June 16, 1821. After having filled the office of clerk in a London bank for some time, he returned to his native place, where he kept a clothier's shop; but he was unfortunate in business, and in 1806 went to Edinburgh as clerk to his brother James. In 1808 he became nominal head of the publishing house of John Ballantyne and company. After the failure of this concern he became a literary auctioneer in Edinburgh. His liveliness, humor, eccentricity, and convivial habits greatly endeared him to Scott, and he was repeatedly mentioned by Wilson, in "Blackwood's Magazine," for his social qualities. He wrote an unsuccessful novel, "The Widow's Lodgings," and for a short time conducted a weekly periodical called "The Sale Room," to which Scott contributed some minor poems, including the humorous piece entitled "The Sultan of Serendib, or the Search after Happiness."

BALLARAT, a city of Victoria, New South Wales, next to Melbourne and Sydney the largest town of Australia, situated at an elevation of 1,437 ft. above the sea, 66 m. W. N. W. of Melbourne. It is divided into Ballarat West and Ballarat East, separated by the Yarowee creek. Ballarat West was erected into a city in September, 1870; pop. in 1871, 40,651 (of whom 1,500 were Chinese), and with the surrounding district, 74,260. The town owes its rapid growth to being the centre of perhaps the richest gold-bearing district of the world. The public buildings in 1871 comprised a spacious hospital erected on high ground, an orphan asylum, a benevolent asylum, a public bath, a free public library, a theatre, eight banks, three town halls, and 56 churches. In the same year Ballarat had four daily newspapers. Gold was first discovered in Ballarat in June, 1851; in December, 1855, it was proclaimed a municipality. Some of the gold mines were in 1871 as deep as some of the coal pits in England, with horses employed in them, and worked by expensive steam machinery. In all it was estimated that there were on the Ballarat gold fields 215 engines of 6,461 horse power engaged in surface mining, and 140 engines of 3,390 horse power used in quartz mining. The district around Ballarat is also well suited for farming purposes.

BALLARD, a W. county of Kentucky, separated from Missouri by the Mississippi river, and from Illinois by the Ohio; area, 500 sq. m.; pop. in 1870, 12,576, of whom 1,477 were colored. It has a moderately uneven surface, with plenty of good timber land. The soil of the southern portions of the county is quite fertile, but in the north it is poor. The chief productions in 1870 were 70,794 bushels of wheat, 577,759 of corn, 28,223 of oats, 18,198 of Irish and 17,220 of sweet potatoes, and 2,863,455 lbs. of tobacco. Capital, Blandville.

BALLENSTEDT, a town of the duchy of Anhalt, Germany, at the foot of the Lower Hartz, on the Getel, 15 m. S. E. of Halbertstadt; pop. in 1867, 4,500. Count Esico IV. of Ballenstedt founded about the middle of the 10th century a collegiate church, which was soon afterward changed into a Benedictine convent. After 1525 a castle took the place of the convent, which had been destroyed by the peasants. In 1765 it became the residence of the dukes of Anhalt-Bernburg.

BALLET (Gr. *βαλλίζειν*, It. *ballare*, to dance), a dramatic representation composed of dancing and pantomime with music. Many passages in the Greek writers show that the ballet of action was in great credit among them. The Romans reached in it, under the reign of Augustus, a rare edgree of perfection. Three dancers above all, Bathyllus, Pylades, and Hyllus, accomplished wonders by their varied performances, in which artistic skill and truthfulness of pantomime were admirably blended. Pylades personified tragic subjects, while Bathyllus excelled in the representation of the comic. These entertainments continued popular down to the fall of the empire; but it was only in the later period that women appeared on the stage; and among the most favorite performers at Constantinople was Theodora, who became the wife of the emperor Justinian. The middle ages present no records of the ballet; but in 1489, on occasion of the marriage of the duke of Milan, a spectacle of the kind excited such admiration that it was introduced in several countries. France was foremost in encouraging this entertainment; in 1581 Catharine de' Medici had a great ballet performed, "Circe and her Nymphs," the expenses of which amounted to 3,600,000 livres. The popularity of the ballet all over Europe was increased in the 18th century by Noverre, whom Garrick called the Shakespeare of the dance. He elevated the character of the ballet, improving it as a whole and in its details, and propagated its principles through the principal European cities, where he was either the foun-

der or the reformer of the ballet; finally, he returned to France, and became chief ballet master of the royal academy of music. "A ballet perfect in all its parts," according to Noverre, "is a picture drawn from life of the manners, dresses, ceremonies, and customs of all nations; it must be therefore a complete pantomime, and through the eyes speak to the very soul of the spectator, and, being a regular representation, ought as far as possible to be under the general rules of the drama. If it does not point out, with perspicuity and without the aid of a programme, the passions and incidents it is intended to describe, it is a divertisement, a succession of dances, and nothing better." Appropriate music is also a constituent part of a good ballet. The Vestris family shone on all the European stages during the latter part of the 18th century, and early in the 19th. Besides the *ballet d'action* or ballet pantomime, which is the only genuine ballet, there are *divertissements*, consisting of little else than steps, leaps, *pirouettes*, and *entrechats*. These are sometimes introduced in operas, as in *Robert le Diable*.

BALLINA, a seaport town of Ireland, county Mayo, separated from county Sligo by the river Moy, 7 m. from its mouth in Killala bay, and 57 m. N. of Galway; pop. about 5,500, including the suburb of Ardnaree, on the right or Sligo side of the Moy, and 1,300 inmates of the union workhouse. Ballina is well built, in a fine situation. It contains a parish church and several Protestant chapels, and has considerable agricultural industry and important salmon fisheries. Its trade has of late years largely increased. The town was captured by the French in 1798.

BALLINASLOE, a town of Ireland, in Connaught, 34 m. E. N. E. of Galway; pop. in 1871, 3,200. The river Suck divides the town into two parts, the larger of which is in county Galway and the other in Roscommon; they are connected by bridges and causeways, over which passes the road from Athlone to Galway. It is a handsome town, and has enormous horse fairs and an active trade in grain.

BALLING, Karl Joseph Napoleon, a Bohemian chemist, born April 21, 1805, died in Prague, March 17, 1868. He studied in Prague and became professor of chemistry in that city. He introduced the use of the saccharometer in breweries, distilleries, and the manufacture of beet-root sugar. His principal work is *Die Gährungschemie wissenschaftlich begründet und in ihrer Anwendung auf Weinbereitung, Bierbrauerei, Branntweinbrennerei und Hefenerzeugung praktisch dargestellt* (4 vols., Prague, 1845–'7; 3d and enlarged ed., 1864).

BALLIOL, or **Baliol. I. John,** king of Scotland, born about 1259, died in Normandy in 1314. He was a descendant of the eldest daughter of the earl of Huntingdon, brother of King William the Lion, and, after the death of the princess Margaret of Norway, granddaughter and heiress of Alexander III., the nearest heir to the throne. He was opposed by Robert Bruce and John Hastings, descendants of younger daughters of the earl of Huntingdon, and by several others. (See Bruce.) The claims of the rivals being submitted by agreement to Edward I. of England, he decided in favor of Balliol, but on condition that he should do homage to him for the crown of Scotland. He was accordingly crowned at Scone in November, 1292, and in December, with the principal nobles of his party, swore allegiance to Edward at Newcastle-on-Tyne. Shortly afterward, being called upon to aid Edward against France, he renounced his allegiance, made an alliance with France, and declared war. Utterly defeated after a short and violent struggle, he was obliged to cede the crown of Scotland to the English king in 1296, who held him and his son prisoners in London till 1299. On his release, finding himself ostracized by public opinion in Scotland, he retired to his château of Bailleul in Normandy. His father and mother were the founders of Balliol college, Oxford. **II. Edward,** king of Scotland, son of the preceding, died at Doncaster in 1363. The king of England invited him over from Normandy in 1324 and 1327, merely to threaten Robert Bruce. In 1332 he was called upon by the dispossessed Anglo-Norman barons to lead them into Scotland to recover their estates there. He entered the frith of Forth, landed at Kinghorn, defeated the earl of Fife, and with 3,000 men marched across the country to meet the earl of Mar encamped on the opposite side of the river Earn with a force of 30,000. A second Scottish army lay within a few miles of Balliol's flank. During the night the invading force crossed the Earn, and with slight loss achieved an astonishing victory at Dupplin Moor, above 12,000 Scots, including the earls of Mar and Moray, and hundreds of knights and barons, falling in the battle. At Perth Balliol defeated the second army, commanded by the earl of March. The disaffected flocked to Balliol's standard, and he was crowned king of Scotland at Scone, Sept. 24, only seven weeks after his landing at Kinghorn. Balliol, having privately rendered homage to Edward III., lay carelessly at Annan, where he was in turn surprised by the earl of Moray, brother of the one slain at Dupplin, and barely escaped to England, after a reign of three months. Edward III. now took up the cause of Balliol, whom the battle of Halidon Hill, July 19, 1333, again placed on the Scottish throne. The Scots were so weakened by this defeat, that he might have retained his power had he not been too obsequious to the English monarch. By a treaty he gave up Berwick-upon-Tweed, and surrendered Berwickshire, Roxburghshire, Peeblesshire, Dumfriesshire, and the Lothians. The Scottish nation now became disgusted, and turned to the young king David Bruce; and after 1338 Balliol maintained only a nominal footing in Scotland, being most of the time a refugee in England. In 1355 Edward III. pur-

chased his claims on the Scottish throne for 5,000 marks, and an annuity of £2,000, and Balliol retired to Yorkshire. He left no issue.

BALLISTA, a military engine of the Romans, used in the siege and defence of fortified places. Neither from the description of authors nor from any carved or painted representation extant—although Trajan's column presents several specimens of these machines—can any distinct understanding be had of the principle or process of working these primitive substitutes for artillery. They were all included under one general term of *tormentum*, which, as is shown by its root *torquere*, to twist, would imply that the propulsion was given by means of the torsion of ropes or fibres. Yet the use of the term is not decisive, since *torquere* came in time to signify simply to hurl a missile by any means. Whatever may have been the method of its operation, the ballista was originally an engine for hurling stones with a parabolic ascent, in order to destroy the battlements of walls and the roofs of buildings in their fall. The ordinary ballista threw stones of three various weights, according to which standard the power of the engines was rated, as our cannon are by their calibre; these were, half a hundredweight, a hundredweight, and three hundredweight—which last appears to have been the maximum. Josephus mentions ballistæ, the destructive power of which he records as very formidable, capable of throwing their missiles with execution to the distance of a quarter of a mile. Vitruvius also mentions smaller ballistæ, which threw stones not exceeding two pounds in weight, and which seem to have been used as field artillery, and to have been plied from the rear, over the heads of the front ranks, into the enemy's lines.—In the middle ages, ballista was the term applied to the crossbow, and in the reign of Henry III. of England there was an officer named *ballistarius*, the keeper of the crossbows, whose pay was a shilling a day, and an *attiliator ballistarum*, whose duty it was to provide the harness and accoutrements of the crossbowmen. In the classics, however, the *catapulta*, not the ballista, is the large wall-crossbow, used in the place of cannon.

BALLOON. See AËRONAUTICS.

BALLOT (Gr. *βάλλειν*, to throw), originally a little ball cast into a box as a mode of deciding anything; now more usually applied to suffrage by written or printed ticket, in distinction from *viva voce* announcement, or by holding up the hand, or other visible demonstration. In Athens it was the common mode of voting in the assemblies of the people, and in the courts, at first by casting pebbles into boxes, and afterward beans, white for the affirmative and black for the negative. If this mode of voting had secrecy specially in view, it accomplished it but imperfectly. The assemblies and courts were held in the daytime in public places, and the voters were separated from the popular audience only by a cordon of ropes. When, therefore, the voters went up to the boxes and deposited their ballots, it was possible to know how they voted. Complete secrecy might have been designed in the court of the Areopagus, which made its decisions at night, and without the presence of an audience. Ostracism, which was a vote of the people for the expulsion of a citizen for a fixed number of years, was done by writing the name of the obnoxious party on a shell. It appears that the assembly of the people at Athens in a legislative capacity passed or rejected a law precisely as it was proposed, without amendment, as in modern times in France and in some of our own states a proposed measure has sometimes been submitted to the people for their approval or rejection.—At Rome secret voting by ballots or tickets was employed, the value of which was sometimes demonstrated by a result different from what might have been expected from popular opinion as openly expressed. Cicero, who did not favor the ballot, because of its tendency to diminish the power of the patricians, nevertheless admits that notwithstanding the laws had been prostrated, yet sometimes they would reappear in the silent suffrages of the people ("*judiciis tacitis aut occultis de honore suffragiis*"). Pliny objected to the ballot (*tacita suffragia*), as affording a screen to corruption; but Gibbon attests its value.—In modern times the ballot has been sometimes demanded for legislative bodies, but not often conceded, the prevailing view being that the action of such bodies ought as far as possible to be open to the observation and criticism of their constituents. It was in use in the Venetian senate, and during the reign of Charles II. was once adopted in Scotland for a short time. In many English corporate bodies, municipal as well as private, the ballot has long been in use; and perhaps it was in imitation of their elections, rather than from any settled conviction of its importance to a free election by the people, that it came to be employed in the New England colonies. Once planted there, it has never been abandoned, but on the contrary the system of open voting which was established in some of the more southern colonies has gradually given way to it. The ballot in the United States is a written or printed ticket having upon it the names of the persons for whom the elector desires to vote for the several offices to be filled at that election, with the proper designation of the office for which each is named. This in some states is so folded as to conceal the written or printed matter, and delivered to an inspector, who immediately deposits it in a sealed box, where it remains until the polls are closed, when a public cavassing of the ballots by the inspectors begins. In this mode complete secrecy is sought to be attained, and the courts have ruled that the elector cannot be compelled afterward in judicial proceedings to disclose how he voted. It being found that political managers sometimes resorted to tickets of a peculiar color, or

with marks on the back, in order that they might be able to determine and mark those who voted against them, the law in some states has forbidden the use of any other than ballots on plain white paper. The secret ballot has also been in use in France, Switzerland, Italy, and Greece. It is also now employed in the Australian colonies. The methods in use there are not uniform: in some the voter receives a ticket with the names of all the candidates upon it, from which he strikes off those he does not desire to vote for, and then deposits it in a box; in others, he designates his preference by making a mark opposite the names of his chosen candidates. A system somewhat resembling ballot voting prevails in other countries, but lacking the distinctive element of secrecy, and therefore not classed under this head. In German states the voting is by written or printed ticket delivered publicly to the officer, who reads off and records the vote immediately, and with as much publicity as if it had been given *viva voce*.—In England the ballot was proposed and received considerable support in the beginning of the 18th century, but it was not till 1830 that it became the subject of much discussion. In that year O'Connell proposed it in the house of commons, and it received 21 votes. Mr. Grote for several years afterward was its most conspicuous supporter, but it had the approval of Macaulay, Cobden, and at length Brougham, among others less noted. It was finally adopted under the leadership of the Gladstone ministry in 1872, with elaborate regulations to secure secrecy.

BALLOU. I. Hosea, an American clergyman, born at Richmond, N. H., April 30, 1771, died in Boston, June 7, 1852. He was the son of a Baptist clergyman, who was conscientiously opposed to receiving any remuneration for his professional services; and consequently he had so few advantages of education, that in learning to write he was obliged to use birch bark instead of paper, and charcoal instead of pen and ink. At the age of 19 he joined the Baptist church under his father's care; but having declared his belief in the final salvation of all men, he was excommunicated. He began to preach at the age of 21, and in 1794 was settled at Dana, Mass. In 1801 he removed to Barnard, Vt., where in 1804 he wrote his "Notes on the Parables" and "Treatise on the Atonement." In 1807 he became pastor of the Universalist church in Portsmouth, N. H., in 1815 removed to Salem, Mass., and in 1817 to Boston, where he became pastor of the second Universalist church, in which relation he continued for 35 years. In 1819 he commenced the "Universalist Magazine," which he conducted alone for several years, and afterward in conjunction with the Rev. Thomas Whittemore. In 1831, aided by his grand-nephew, Hosea Ballou, he commenced the "Universalist Expositor," a quarterly publication, to which he continued to contribute until his death. Among his published works, besides those mentioned, are 26 "Lecture Sermons," 20 "Select Sermons," an "Examination of the Doctrine of Future Retribution" (1846), and a volume of poems, mostly hymns, many of which are embodied in the "Universalist Collection," edited by Adams and Chapin. He preached more than 10,000 sermons, none of which were written till after their delivery. Two of his brothers, Benjamin and David, also became Universalist preachers. Two memoirs of him have been published, one by his son, M. M. Ballou, the other by Thomas Whittemore (1854). **II. Hosea,** a Universalist clergyman, grand-nephew of the preceding, born at Halifax, Vt., Oct. 18, 1796, died at Somerville, Mass., May 27, 1861. In 1815 he became pastor at Stafford, Conn., and subsequently at Roxbury and Medford, Mass. In 1853 he was elected president of Tufts college, Somerville, Mass., and after visiting Europe for the purpose of studying the systems of collegiate education, he entered upon the duties of the college in 1855. In 1822 he had become one of the editors of the "Universalist Magazine," now published under the name of "The Trumpet," and in 1832, in conjunction with his uncle, he established the "Universalist Expositor," the title of which was subsequently changed to the "Universalist Quarterly." He wrote "The Ancient History of Universalism" (1829; 2d ed., 1842); edited Sismondi's "History of the Crusades" (1833); and published a "Collection of Psalms and Hymns for the Use of Universalist Societies and Families" (1837). **III. Maturin Murray,** son of Hosea Ballou, of Boston, born in Boston in 1822. He has edited literary journals entitled "Ballou's Pictorial" and "The Flag of Our Union," and written a "History of Cuba" (1854), "Biography of the Rev. Hosea Ballou," "Life Story of Hosea Ballou," and "A Treasury of Thought; an Encyclopædia of Quotations" (1872). In 1872 he became one of the founders and chief editor of the "Boston Globe," a quarto daily journal. **IV. Moses,** cousin of the preceding, born at Monroe, Mass., in 1811. He is author of a "Memorial of Sanford" and the "Divine Character Vindicated," and is a frequent contributor to the "Universalist Quarterly."

BALLSTON SPA, a post village, the capital of Saratoga county, N. Y., situated in a valley on a branch of the Kayaderosseras creek, 7 m. S. W. of Saratoga Springs; pop. in 1870, 2,970. Its mineral springs were once extensively frequented, but have declined in popular estimation. It has a court house, bank, two weekly newspapers, and several churches. The Saratoga and Schenectady and Rensselaer and Saratoga railroads pass through the place.

BALLYMENA, a market town of Ulster, Ireland, in county Antrim, on the river Braid, 23 m. N. N. W. of Belfast; pop. in 1871, 6,739. It is largely engaged in the linen manufacture, and has weekly markets for the sale of linens, grain, and provisions. The Belfast and Northern Counties railway passes through it.

BALM OF GILEAD, a plant of the genus *amyris*, the *balsamodendron Gileadense* of De Candolle. Its leaves yield when bruised a strong aromatic scent. From this plant is obtained the balm of Gilead of the shops, also called balsam of Mecca or of Syria. This has a yellowish or greenish color, a warm and somewhat bitter aromatic taste, and a fragrant smell. It is valued as an odoriferous ointment or cosmetic by the Turks, who often adulterate it for the market. The amyris is a low tree or shrub, growing in several parts of Abyssinia and Syria. It has spreading, crooked branches, small bright green leaves growing in threes, and small white flowers on separate footstalks. The petals are four in number, and the fruit is a small egg-shaped berry, containing a smooth nut. To obtain the juice, the bark of the tree is cut at the time when its sap is in its strongest period of circulation. As the juices ooze through the wound they are received into small earthen bottles, every day's produce being poured into larger bottles and corked. When fresh, the smell of the balsam is exquisitely fragrant, but if left exposed to the atmosphere it loses this quality. The quantity of balsam yielded by one tree is said never to exceed 60 drops in a day. It is therefore very scarce, and can with difficulty be procured in a pure and unadulterated state, even at Constantinople. Its stimulating properties upon the skin are such that the face of a person unaccustomed to use it becomes red and swollen after its application, and continues so for several days. The Turks use it as a cosmetic, and also take it internally, in minute doses, in water, to stimulate the stomach. It seems to have been as highly esteemed by the ancient inhabitants of Syria as it is by the modern Turks and Arabs. Josephus states that the balm of Gilead was one of the trees given by the queen of Sheba to King Solomon.—The *abies balsamea*, which furnishes Canada balsam, and the *populus balsamifera*, var. *candicans*, the buds of which are covered with a resinous varnish, are both sometimes known as balm of Gilead trees.

Balm of Gilead.

BALMES, Jaime Lucio, a Spanish theologian and philosopher, born at Vich, Catalonia, Aug. 28, 1810, died there, July 9, 1848. He was ordained in 1832, and was for a time professor at the university of Cervera. He resisted the movements of the revolutionary party in Spain, though he sympathized with liberal institutions. In his opinion, the hope of the future lay in the union between Catholicity and political liberty. His principal works are: *El Protestantismo comparado con el Catolicismo en sus relaciones con la civilizacion europea* (4 vols., Barcelona, 1842–'4), which passed through several editions, and has been translated into English and other languages; *El criterio* (Madrid, 1845; French and German translations, 1850–'52); and *Filosofia fundamental* (4 vols., Barcelona, 1846; French translation, 3 vols., 1852; English version by Henry F. Brownson, 2 vols., New York, 1857). A complete edition of his political writings appeared in 1847, and biographies of Balmes have been published in Spanish, French, and German.

BALMORAL, a summer residence of Queen Victoria, in the Scottish highlands, parish of Crathie, Aberdeenshire, on the right bank of the Dee, 44 m. W. S. W. of Aberdeen. The castle stands on a natural platform, at the foot of Craig-an-gowan, about 900 ft. above the sea. The estate was leased in 1848 and purchased in 1852 by Prince Albert. It comprises an area of over 100,000 acres, including 1,000 acres of woodland, and a deer park of 30,000 acres. The scenery is highly romantic, and the neighboring country is famous for its deer stalking, grouse shooting, and lake and river fishing. Near the Ben-a-bourd, one of the most picturesque mountains, is the monument to Prince Albert erected by the queen in 1863.

BALNAVES, Henry, a Scotch Protestant reformer, born at Kirkcaldy, Fifeshire, in 1520, died in Edinburgh in 1579. He studied in Scotland and Germany. His open profession in 1542 of the Protestant faith caused his dismissal from the office of secretary of state, after which he joined the English and was imprisoned in Blackness castle till 1544. He was implicated in the conspiracy resulting in the murder of Cardinal Beaton, declared a traitor, and excommunicated. At the siege of the castle of St. Andrews he was captured, and confined with Knox and others in the castle of Rouen, France, where he wrote a treatise on justification, which was annotated by Knox and published in Edinburgh in 1584, under the title of "Confession of Faith." On his release in 1559, he participated in the contest against Mary, became one of the negotiators of the treaty of Berwick, was reappointed to the bench in 1563, and one of the commissioners for the revision of the Book of Discipline. Subsequently he, Buchanan, and others were counsellors of Murray in the case of Mary Stuart.

BALSAM, in botany, a class of plants forming the genus *impatiens*, of the natural order *geraniaceæ*. It has 135 species, most of which are natives of the East Indies and China, but some have long been known in European gardens. The generic characteristics of the balsams are a succulent stem filled with a watery juice, simple leaves growing without stipules, irregular flowers with one of the petals spurred, five stamens, distinct stigmas, and a capsule with

five valves, and remarkable for the elastic force with which it bursts and expels the seeds.

Garden Balsam.

The *I. hortensis*, balsamine, or garden balsam, a beautiful and popular annual, sometimes improperly called lady's slipper, with finely variegated white, pink, red, purple, and lilac flowers, is the best known member of this genus. This loves a moist rich soil, and is raised best from the seed in a moderate hot-bed. The juice of some of the species of *impatiens*, mixed with alum, is used by the Japanese to dye their finger nails red.

BALSAMS. By the French chemists this word is applied only to those resinous vegetable juices which contain benzoic acid; and of these there are but six, namely, the balsam of Peru, the balsam of Tolu, dragon's blood, benzoin, storax, and liquidambar. But by the Germans and English the term is not thus limited in its signification, being applied to all resins obtained from trees and shrubs, as also to some pharmaceutical preparations, dividing them into two classes—one containing benzoic acid, and the other not. The former class, consisting of the six named, are aromatic, resinous substances, composed of resin, benzoic acid, and a volatile oil, the last, according to the quantity present, tending to give liquidity to the substance. They are soluble in alcohol, and water being added resin is precipitated, making the fluid milky. In ether they are only partially soluble, and not at all in water. The peculiar smell of the balsams is lost by exposure to the air. Their taste is described as hot and acrid. The plants which furnish them belong to the orders *styracæ*, *leguminosæ*, and *balsamaceæ*. The second class of balsams are the semi-liquid and resinous juices composed only of resin and a volatile oil, and obtained mostly from plants of the orders *coniferæ*, *terebinthaceæ*, and *leguminosæ*. The turpentines, and Canada, copaiba, and Mecca balsams belong to this class. They do not differ essentially in their properties from the other balsams. The use of balsams is principally in medicine, but they also enter into the composition of varnishes, and are employed for some other purposes, which will be mentioned in the description of each one. Benzoin and turpentine will be treated of under their own titles.—A full history and description of the balsam of Peru, by Dr. Pereira, may be found in the "Pharmaceutical Journal" (English); and an able paper, made up from this, is published by Dr. Muspratt in his work on chemistry, with which will be found drawings and botanical descriptions of the plants producing the balsams. So much error and uncertainty has prevailed in the accounts of this substance, that very elaborate investigations have been made by Dr. Pereira and others to define its true character, and that of the plants producing it. There appear to be two balsams in Peru, one called the white balsam, and the other the black, which is the real balsam of Peru of commerce. Both are obtained from the *myrospermum pubescens* of De Candolle, the one from the fruit by pressure, and the other by incision from the stem; and both are procured exclusively "from the so-called Balsam Coast in Central America," the Pacific

Balsam of Peru (Myrospermum pubescens).

coast of San Salvador, between lat. 13° and 14° N. Sonsonate appears to be the most important district for the production of the balsam; and the tree which there yields it is possibly a different species from the *myrospermum pubescens*, and has been temporarily called by Dr. Pereira the *myrospermum* of Sonsonate. Black balsam exudes from incisions in the trunk of this tree, and is said to be an admirable remedy for effecting the speedy cure of wounds. Spirit of balsam is made from the flowers, oil of balsam, an excellent anodyne, from the seeds and nuts, and white balsam from the capsules. The tincture or essence of balsam, called *balsamito*, is extracted from these. The methods practised by the Indians of preparing the white

and black balsams are very differently described by different authorities, and these descriptions are given in the paper referred to. The black balsam is a sirup of the consistency of honey, of a deep red-brown color, translucent, of a strong smell, and an intolerably acrid bitter taste. Owing to its high price it is found profitable to adulterate it, and this is done with olive oil, oil of turpentine, and copaiba. It is tested by mixing a few drops of it with twice as many of concentrated sulphuric acid, and then adding water; if pure, a little resin is obtained. Copaiba may be detected by the smell. When pure, 1,000 parts of balsam will, by the benzoic acid it contains, saturate 75 parts of crystallized carbonate of soda. The composition of the balsam, according to Stolze, is as follows:

Brown, slightly soluble resin	2·40	per cent.
Brown resin	20·70	"
Oil—cinnameine	69·00	"
Benzoic and cinnamic acids	6·40	"
Extract	0·60	"
Loss and moisture	0·90	"
	100·00	"

This balsam is used in perfumery, in the manufacture of sealing wax, lozenges, tinctures, pomatums, and as a substitute for vanilla in liqueurs, chocolate, &c.—Balsam of Tolu is obtained in New Granada, South America, in the region of Tolu and Turbaco, a few miles S. of Cartagena, and also along the Magdalena river. The tree which produces it is the *myrospermum toluiferum*. The balsam differs very little from that of Peru, only it becomes resinified more easily. Their chemical composition is the same. When fresh it is of a reddish brown color, soft like turpentine, but gradually becomes harder. It has an agreeable odor like benzoin, and a sweetish taste. It is often

Balsam of Tolu (Myrospermum toluiferum).

adulterated with resin, which may be detected by the fumes of sulphurous acid, which are set free when sulphuric acid is poured upon it and the mixture heated. If no resin is present, the odor of benzoic and cinnamic acid is perceived.—Dragon's blood is the product of an East India tree, called the *calamus draco*, and is also obtained in Africa and South America from a number of other trees. It is prepared in the form of drops and small balls of a dark red color, and is also put up in sticks and irregular-shaped cakes. Its use is for coloring varnishes, staining marble, preparing gold lacquer, and for tooth powders and washes. It was formerly used in medicine as an astringent, but is now regarded as inert.—Storax is rarely met with unadulterated with foreign matters; and the various mixtures sold by this name have caused uncertainty as to its real character. It is often confounded with liquidambar, but is distinguished from it by its peculiar vanilla-like odor, which, as well as the *styrax* family of plants, from which it is procured, connect it more closely with benzoin. The species of the tree is the *officinalis;* it grows

Styrax officinalis.

in Asiatic Turkey, and the shipments of this balsam are from Trieste. It is of liquid consistency, and of gray, brown, or black color, according to its purity. Its uses are in medicine as an expectorant, and as an ingredient in ointment.—Liquidambar is the resinous product of the common sweet gum tree of the United States. It is only, however, in the warm latitudes of Mexico and Louisiana that this tree yields its balsam. This is of thin consistence, yellowish color, agreeable smell, and acrid taste. It becomes thicker, of darker color, and contains a larger proportion of benzoic acid, as it increases in age. It may be used for the same purposes as storax, but is more highly esteemed and better known in Europe than in this country.—The Chinese lac, or varnish, is described by Dr. Ure as a balsam of the benzoic acid class, and derived from the bark of the *augia sinensis*.—The Canada balsam is the gum that exudes from the balsam

fir, *abies balsamea*, of the northern states. It is collected by breaking the vesicles which form on the trunk and branches, and receiving their contents in a bottle. Its color is whitish, slightly yellow, and its odor like that of the turpentines. Its analysis is thus given by Bonastre:

Essential oil	18·6	per cent.
Resin soluble in alcohol	40·0	"
Resin soluble with difficulty	33·4	"
Elastic resin	4·0	"
Bitter extract and salts	4·0	"
	100·0	"

It is used in the preparation and preservation of objects for the microscope, and in a few unimportant medicinal compounds.—The copaiba balsam is obtained from the *copaifera officinalis*, a tree of Brazil and Guiana. It is of

Balsam Copaiba (Copaifera officinalis).

yellowish color, semi-liquid consistency, a bitter sharp taste, and a disagreeable suffocating smell. It will dissolve one fourth its weight of carbonate of magnesia, and continue translucent. With alkalis it gives crystalline compounds. It contains an oil that dissolves caoutchouc. Its composition, according to Durand, is:

Volatile oil	38·00	per cent.
Copaiba acid	52·75	"
Brown soft resin	1·66	"
Water and loss	7·59	"
	100·00	"

Its use is principally in medicine, for altering the secretions of the mucous membranes by which it is excreted, namely, those lining the respiratory and urinary organs. The resin is said to be more active therapeutically than the oil. It is also used for liqueurs, and for making paper transparent. It is often largely adulterated with castor oil and with turpentine.—Mecca balsam, called also opobalsam, is the product of the *balsamodendron Gileadense* of the East. Its properties are similar to those of balsam of copaiba and liquid turpentines. (See Balm of Gilead.)

BALTA (formerly *Józefogrod*), a town of Russia, capital of a circle of the same name, in the government of Podolia, on the Kodyma, a tributary of the southern Bug, 160 m. S. E. of Kamenetz; pop. in 1867, 14,528. Its suburb on the S. side of the river, now in the government of Kherson, formerly belonged to Turkey, while the chief part of the town was in Poland. It has three Greek churches, a Roman Catholic church, a synagogue, two schools, and factories of candles, soap, and tallow. It carries on a brisk trade, principally in manufactured articles, horned cattle, horses, hides, wool, and cereals. Two fairs are annually held here. In 1780 the greater part of the place was destroyed by the Russians.

BALTACCHINI. I. Saverio, an Italian poet, born at Barletta, April 27, 1800. He was for some time a journalist, and has published *La giojetta*, *Claudio Vannini* (Naples, 1836), *Ugone di Cortona* (1838), and other poetry, and made translations from Byron and Shelley. In 1848 he was one of the chief editors of a scientific and literary periodical and of a political journal, and afterward he was for a time prominent in politics at Naples, and president of the committee of public instruction. **II. Michele,** an Italian historian and novelist, brother of the preceding, born in Naples, Feb. 11, 1803. His *Novelette morali* (1829) and *Istoria di Masaniello* (1831) have passed through many editions. He is also the author of a historical romance and of disquisitions on the life and writings of Campanella (1840–'43), and on the philosophy of Kant (1854).

BALTA LIMAN (anc. *Phidalia*, or *Portus Mulierum*), a bay and port on the European side of the Bosporus, in lat. 41° 10′ N. and lon. 29° 8′ E., between Rumili Hissar and Therapia. It was formerly a place of rendezvous for the Turkish fleets. A convention was concluded here May 1, 1849, between Russia and Turkey, in which it was stipulated that Russia should have for seven years an equal right with Turkey to interfere in the affairs of the Danubian principalities, and keep there 10,000 men as an army of occupation.

BALTARD. I. Louis Pierre, a French architect and engraver, born in Paris, July 9, 1765, died Jan. 22, 1846. He was architect of the Pantheon and of the Paris prisons, and executed the chapels of the houses of detention of St. Lazare and Ste. Pélagie, the greater part of the hall of justice in Lyons, and other remarkable buildings; was a member of the board of public works, and in 1818 became professor at the academy of fine arts. He left many superb works descriptive of monuments and illustrated by his own plates; published the "Athenæum," a journal of art; and excelled in the engraving of historical and miscellaneous subjects. **II. Victor,** son of the preceding, born in Paris, June 19, 1805. He studied under his father and in Italy, became architect of the government and of the city of Paris, and chief superintendent in the academy of fine

arts. He directed many court festivals, restored some of the principal churches of Paris, built the church of St. Augustine, which was opened in 1868, and was the architect of the central halls in Paris. He has continued the publication of the *Grands prix d'architecture*, which had been begun by his father; prepared under the patronage of the duke de Luynes the plates for a work on Norman and Swabian monuments in Italy; and published the text and designs of the *Villa Médicis* (1847–'8), and other works. One of his earlier productions, *Le théâtre de Pompéi*, executed in Italy in 1837, gained him a medal at the Paris exposition of 1855; and his *Projet de restauration de Saint Eustache* was greatly admired at that of 1859. He was chosen a member of the academy of fine arts in 1863. **III. Prosper,** brother of the preceding, born in Paris, Nov. 1, 1796, is also an excellent architect, and became in 1850 inspector of the new Louvre buildings. **IV. Jules,** a third brother, born in Paris, June 3, 1807, is a portrait painter.

BALTIC SEA (anc. *Pelagus Scythicum* or *Mare Suevicum;* Ger. *Ostsee*, eastern sea), an inland sea of N. Europe, nearly enclosed by Sweden, Russia, Germany, and Denmark, and communicating with the Cattegat and the North sea by the Sound and the Great and Little Belt. Its extremes of latitude are Wismar, in Mecklenburg, 53° 53′ N., and Tornea, on the gulf of Bothnia, 65° 51′ N. Its greatest length between these points is 900 m. Its width varies from 200 to 75 m. Its area, including the gulfs of Bothnia, Riga, and Finland, is estimated at about 150,000 sq. m. This is exclusive of the Cattegat and the Skager Rack, for which a further addition of 18,000 to 19,000 sq. m. must be made.—The direction in which the Baltic penetrates inland is extremely tortuous. From its straits it runs first E. to Memel, about 300 m., then N. as far as the latitude of Stockholm, 59° 21′, a further distance of 260 m. It is to these portions that the term Baltic sea is in its limited sense restricted; for at this point it separates into two great gulfs. Of these the gulf of Finland runs nearly due E. between Finland and Esthonia, while the gulf of Bothnia runs a little E. of N. between Finland and Sweden. The gulf of Finland is 250 m. long, with a mean breadth of 60 to 70 m. That of Bothnia is about 400 m. long, with 120 m. of average width, although at its narrowest part it is not above 40 m. wide. Another important inlet is the gulf of Riga or Livonia, S. of the gulf of Finland, and extending between Livonia and Courland, 70 m. from E. to W., and about 90 m. from N. to S.—The Baltic is shallow. The greatest depth, between Gothland and Windau, was found in 1871 to be 720 ft. At a depth of 600 to 700 ft., at the latter end of July, the temperature was 33° to 36·5° F. No marine plants were found in this cold area, and only a few annelida. Life was very abundant to the depth of about 300 ft., while plants were seldom found at a depth of more than 30 ft. The entrance to the sea is crowded with islands and shoals, and as the Baltic itself has no regular tides, the varying currents, depending upon prevailing winds and changing temperature, add to the difficulties of the navigator. The western portions of the sea have a depth of not more than 16 fathoms. Toward the east it deepens, and midway between Memel and Oeland there is found from 60 to 100 fathoms water. The gulf of Finland suddenly shoals from 50 to from 4 to 16 fathoms. The gulf of Bothnia has no greater average depth, but its navigation is less obstructed by shoals and sand banks.—The basin of the Baltic is difficult to determine accurately, as, with the exception of the mountains of Sweden and Norway on the north and northwest, all its other borders stretch away in vast plains, occupying a large part of Europe. This great district is exceedingly well watered; upward of 200 rivers flow into the Baltic; the lakes in its neighborhood, with many of which it is connected by rivers, are almost innumerable; and altogether this sea receives the drainage of nearly one fifth of Europe. The most peculiar part of this basin is in its S. W. corner. Here, although the nearest mountains are those of the Hartz, yet the basin of the Baltic is not above 20 or 25 m. wide. The Elbe, which runs within 50 m. of the Baltic, flows into the North sea; so also the Eider, which rises close to its shores. These and their tributaries belong to another system; yet so flat is the country that the different waters continually unite, and a canal 3 m. long has served to connect the Baltic with the Elbe, by joining a small affluent of the latter with the Stecknitz and Trave, between Lübeck and Lauenburg. The Baltic receives, among others, the waters of the lakes of Ladoga, Onega, and Mælar, and of the rivers Düna, Niemen, Vistula, and Oder. The rivers which flow from the south and southeast are the longest. The great amount of mud and sand carried down into the sea has considerably changed its soundings in various parts, filling up the mouths of many of the rivers and harbors, and generally raising the bed of the entire sea, creating many small islets and shoals, and rendering navigation, particularly along the Danish shores, difficult and dangerous.—Being a close sea, with its entrance protected from the approach of the tidal wave, the Baltic has no tides. There is, however, observed at irregular periods a rise in the water, equal sometimes to 3½ ft. This occurs at all seasons of the year, but chiefly in autumn or winter, or at a time of heavy rain, or during lowering weather. The water maintains its height for days, and sometimes weeks, and often overflows its usual limits. Dr. Schulten, a Swede, in 1804, by a series of close observations, ascertained that this rise was occasioned, not by heavy rains, winds, melting snow, or ice, to all of which it had been ascribed, but by the unequal pressure

of the atmosphere upon different portions of the surface of the sea; the greatest height of the water corresponding to the greatest depression of the barometrical column, and the greatest variation of the barometer in that region, 2½ inches, corresponding to a rise and fall of 34 inches in the water. The waters of the Baltic are much less salt than those of the North sea or the Atlantic ocean; the relative proportion may be stated as about $\frac{1}{54}$ to $\frac{1}{28}$ in the North sea. The entire sea is every year more or less encumbered with ice, and its straits are usually impassable from December to April. Severe frosts have made the sea several times passable on the ice in its widest parts, between Denmark and Prussia, especially in the 14th and 15th centuries. In 1809 a Russian army crossed the gulf of Bothnia on the ice.—There seems to be no doubt that the Baltic is decreasing. The innumerable lakes which lie between it and the White sea are but the remnants of what was once a continuous sea. This is proven by the existence of similar animals in those lakes, although these are no longer salt. A gradual drainage is no doubt lessening the volume of all the bodies of water still left in the basin of the Baltic. It is in the south that such changes have been most remarked in modern times. Lübeck, which when originally built was a seaport town, is now 12 m. from the shore. The isle of Rügen is nearly joined to the German shore, and annually extends its bounds, while the names of its various parts show that not long since that which is now one large island was a cluster of small islets. Olaf Dalin, a Swedish mathematician, calculated the rise of the shore at one inch per annum, and this is probably not too high.—The Baltic is extremely rich in fish of various kinds. Seals are found in considerable numbers, and are chased for their oil and skins. Whales are sometimes seen. Along the shores of East Prussia and the isle of Rügen quantities of amber are collected. The countries surrounding the Baltic are all rich in useful natural products, and its waters are therefore crowded with the ships of all nations.—The ancients were but slightly acquainted with the Baltic. The origin of the name Baltic is not certainly known, some etymologists deriving it from the Danish *belt*, a girdle; some from the Lithuanian *balta*, white, in allusion to the great quantity of snow which annually falls in its neighborhood. Others have referred it to the Balti, the family name of the kings of the Visigoths. The name, however, is old, and appears to have been first used by Adam of Bremen, who described the sea in the 11th century. The most important ports on the Baltic and its various arms are St. Petersburg, Riga, Memel, Königsberg, Dantzic, Stralsund, Lübeck, Copenhagen, Carlscrona, and Stockholm.

BALTIMORE, a northern county of Maryland, bounded N. by Pennsylvania and S. by the Patapsco; area, 718 sq. m.; pop. in 1871, 330,741, of whom 47,921 were colored. The larger portion of the surface is undulating, with wooded ridges enclosing fertile valleys, and with bold hills often rising to a height of 800 ft. above tide water. The principal varieties of rock are granite, gneiss, hornblende, limestone, and a ledge of primitive rock running through the southeastern portion of the county. On the Great and Little Gunpowder, the Patapsco, Gwynn's and Jones's falls are large cotton, woollen, and carpet factories, furnaces, founderies, paper and flour mills. Copper and iron are found in considerable quantities, and in this and Harford counties are the most productive mines of chrome in the United States. In the neighborhood of Texas and Cockeysville are extensive quarries of marble, from which came the large monoliths of the capitol at Washington, and the fine-grained alum marble used in building the patent office. The soil is moderately rich. The chief productions in 1870 were 264,568 bushels of wheat, 31,182 of rye, 856,754 of Indian corn, 375,063 of oats, 201,754 of potatoes, 35,791 tons of hay, and 544,888 lbs. of butter. The value of the principal manufactures in 1866 was: flour and meal, $2,425,887; cotton, $2,113,414; machinery, $1,100,000; woollens, $435,250; iron, $612,594; paper, $297,400; hides and leather, $294,981; liquors, $162,277. The county seat was transferred in 1854 from Baltimore to Towsontown.

BALTIMORE, a city of Baltimore county, Md., ranking fifth in the United States for size and population, situated in lat. 39° 17′ N., lon. 76° 37′ W., on an arm of the Patapsco river, 14 m. from Chesapeake bay, 178 m. from the Atlantic, 38 m. by rail N. E. of Washington, 97 m. S.W. of Philadelphia, and 185 m. S.W. of New York. The population in 1790 was 13,503; 1800, 26,514; 1810, 35,538; 1820, 62,738; 1830, 80,625; 1840, 102,313; 1850, 169,054; 1860, 212,418; 1870, 267,354. In 1870, 227,794 were whites and 39,558 colored; 210,870 were natives of the United States, and 56,484 of foreign countries. The arm of the Patapsco on which the city is situated is about 3 m. long, varying in width from ⅛ to 1¾ m., having its extreme breadth opposite the eastern part of the city, a suburb called Canton. This inlet gives an easy access to the city, and a harbor sufficiently capacious to contain 2,000 vessels. The harbor is divided into an outer and inner bay; the inner bay is styled the basin, and has but 12 feet of water. The outer bay consists of a harbor between Fell's Point and Canton on the north and east, and Whetstone Point opposite, on the south, and is capable of floating the largest merchant ships. Owing to the accumulation of deposit for many years, the harbor had at one time become shoal in numerous parts, but by proper dredging it has been made available for steamers of the largest class. The entrance to the port is defended by Fort McHenry, situated on a point of land between the harbor and the Patapsco. This was successfully defended against the British

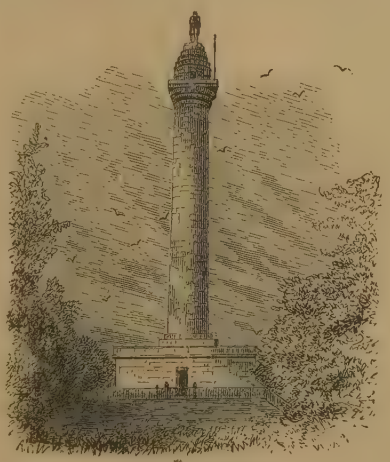
fleet in 1814 by Col. George Armistead and the force under his command. It was on this occasion that the famous song of the "Star-Spangled Banner" was composed by Francis S. Key, while a prisoner on board one of the British vessels. Fort Carroll, an immense fortification on Soller's Point flats, about 8 m. below the city, after involving the government in a heavy expenditure, has been roofed over and abandoned.—The general appearance of Baltimore is striking and picturesque. It is regularly laid out, its surface is undulating, its streets are of good width, and there is ample sewerage. An aspect of cheerful elegance prevails; the larger mansions are generally in good taste, and not crowded together, and the dwellings of the poor are generally neat and thrifty. There are very few of the large tenement houses common in other cities. The light and cheerful appearance of the city is greatly owing to the quality of the brick used in building. The clay is of fine texture and agreeable color, and when taken from the kilns is neither a very dull nor a glaring red. The Baltimore county marble, a fine, hard, and beautifully white species of limestone, extensively employed in building churches, public buildings, and in some private residences, adds also materially to this effect. The chief points of view are known as Federal hill and Patterson park. The former stands on the south side of the inner basin, crowned by a signal station, and commands an extensive prospect of the shipping, the city to the north and west, and the river and bay. The park, comprising about 56 acres, lies to the east of Fell's Point, and overlooks the principal docks and ship yards, Canton, and the surrounding country.

Baltimore, from Federal Hill.

On the N. side of the city is Druid park, a fine pleasure ground of 600 acres, with an undulating surface, partly in wood and partly in open meadow. It has recently been purchased at a cost of about $800,000, and its architectural decorations are as yet but few. Its chief charm is in its secluded walks, rides, and bridle paths. The annual revenue of the park is derived from a tax of one fifth of the gross receipts of the city passenger railways. Within the borders of Druid park is Druid lake, the last of the chain of costly lakes and reservoirs recently constructed to supply the city with pure water. From main elevations in Druid park, and especially from the head of Druid lake, fine views of the city and river can be obtained.—Besides the main streets, three great avenues on the east, north, and west have been surveyed, and are partly graded, paved, and built upon. These are at least 150 feet wide, planted with trees, and form an elevated drive around the city. There are 12 public squares. The largest of the public buildings is the exchange, which contains the custom house, post office, Merchants' bank, exchange, reading rooms, a vast rotunda for public sales, &c. The Athenæum is of the Italian style of architecture; it contains the rooms of the historical society and the mercantile library association, a very flourishing institution, with a large number of members, and 26,000 volumes on its shelves. The Maryland institute "for the promotion of the mechanic arts" is a large structure, 355 ft. long by 60 wide; it is built upon piles, and over the centre or Marsh market. An annual exhibition of the products of American mechanical industry is held in the main hall, which is 260 ft. long. It also contains a library, lecture rooms, school of design, chemical school, &c. The new city hall, now

nearly finished (1873), is one of the finest municipal structures in the country. It occupies an entire square, on Holliday, North, Lexington, and Fayette streets, and is 125 ft. in height to the top of the centre building and 222 to the top of the dome. The renaissance style predominates. The material used for the outer walls is Maryland marble, with an inner casing of brick, and the building is fire-proof. Its entire cost will be $3,000,000. The court house, on Monument square and Lexington street, has ample accommodations for three courts besides various offices. Near it is the record office, a fire-proof building of solid granite. The jail, built in 1864, and containing all the modern improvements in prison discipline, is a substantial structure of hammered stone, flanked by square towers, with a high wall on the sides and rear. The penitentiary, a large brick building, adjoins it on the southeast. The city contains 189 churches, viz.: 21 Protestant Episcopal, 18 Presbyterian, 23 Roman Catholic, 55 Methodist Episcopal (of which 6 are colored), 8 Methodist Protestant, 2 Independent Methodist, 6 African Methodist, 6 Reformed, 1 Christian, 9 Baptist, 12 Evangelical Lutheran, 2 Evangelical Association, 2 Independent, 1 Seamen's Union Bethel, 3 Friends', 1 Universalist, 1 Unitarian, 3 Swedenborgian, 9 Jewish synagogues, and 6 United Brethren. Many of the churches are very fine. The Roman Catholic cathedral, the most imposing, is in the form of a cross, and surmounted by a lofty dome and two bell towers. The church of St. Ignatius Loyola, St. Alphonsus, and many others, are rich in architecture and decorations. Many of the Protestant churches are elegant. Of other public buildings, the vast state tobacco warehouses well repay inspection.—The total number of charitable institutions is 22. The more prominent of these are the new state insane asylum; the Mt. Hope retreat; the Maryland institution for the instruction of the blind, in the northern part of the city; St. Mary's industrial school for boys; the orphan asylums of St. Anthony of Padua and of St. Vincent de Paul; and the Baltimore infirmary, also under the supervision of the Sisters of Charity. The church home, on Broadway near Baltimore street, belonging to the Episcopal church, and the Union Protestant infirmary, are under the management of ladies. In the W. part of the city is an elegant edifice called the aged widows' home, and near it is a similar structure for aged men. The house of refuge and city almshouse are situated near the Frederick turnpike, about two miles from the city. During the year 1871 over $600,000 was bequeathed by wealthy citizens to charitable purposes.—St. Mary's college, a Roman Catholic institution under the charge of the Sulpitians, with a theological seminary, was founded in 1791, and maintained itself with vigor for many years, possessing very extensive grounds and buildings, a Gothic chapel, and a library of 16,000 volumes. The seminary had 70 pupils in 1871. The college was suppressed in 1851. Loyola college, in another part of the city, supplies its place for Roman Catholics; this is under the charge of Jesuits, and was opened in 1855; in 1871 it had 158 students and a library of 21,000 volumes. The Roman Catholic female seminary of Notre Dame was chartered in 1864, and in 1871 had 170 pupils. Baltimore college was chartered in 1803, and subsequently united to the medical school under the title of the "University of Maryland," but the academical department, independent of the school of medicine, alone went into operation. This academy was not generally flourishing, and in 1854 was finally given up, and a scientific school established in the building. The medical school, on the contrary, has always been active; at one time it stood highest in the United States, and is now in excellent condition; in 1871 it had 10 instructors and 172 students. It has a massive building on Lombard street, completed in 1812. The Washington university was established in 1828, but has never been very flourishing, and its medical school, which in 1871 had 9 instructors and 170 students, is the only department ever organized. The Baltimore female college (Methodist Episcopal) was chartered by the state in 1849, and in its course of study and power of conferring degrees is similar to the colleges for male students; it had 175 pupils in 1871. The convent of the Visitation has a very large female school under charge of the sisterhood. The first public school was opened in 1829. By one of the sections of the act providing for public education throughout the state, passed by the legislature in 1870, the control of the public school system of Baltimore is vested in the mayor and city council. The entire management of the schools is intrusted by the mayor and council to a board of 20 commissioners, one from each ward, elected annually. On Jan. 1, 1872, there were under the authority of this board the city college, 2 female high schools, 18 male and 19 female grammar schools, 28 male and 31 female primary schools, 10 day and 3 evening colored schools, and 2 schools unclassified; total number of schools, 113. Male teachers, 70; female teachers, 508; total number of teachers, 578. Number of pay pupils, 11,627; free, 13,730; total on roll Jan. 1, 1872, 25,357. Number in all the schools during 1871, 34,872; number in colored schools, 2,048; increased attendance over 1870, 7,316. The total amount expended for school purposes in 1871 was $583,108. To those who can afford it, a charge of $1 a term of 12 weeks is made for each pupil; all others are admitted free on application to the board of education. The Bible is daily read in all the schools, the version of King James to the Protestants, and the Douay version to the Roman Catholics, in separate apartments. The principal libraries are the state law library, containing 8,000 vols.; Odd Fellows', 21,136; and mercantile,

26,000. There are published in the city 9 daily newspapers, of which 3 are in German; 1 tri-weekly; 16 weekly, of which 3 are in German; 9 monthly; and 1 quarterly, the "Southern Review." The Peabody institute was founded by the munificence of Mr. George Peabody. His first gift of $300,000, subsequently increased to $1,000,000, is to establish a gallery of the finest works of art, a library of the first class, and, during certain seasons of the year, concerts and lectures. The institute, a marble building facing the Washington monument, contains the concert hall on the first floor and the library on the second floor. The library numbers nearly 20,000 volumes of standard works, and is increasing at the rate of from 4,000 to 5,000 volumes annually. It is a library of reference, and its books are free to all for use within the rooms. To the east of the present building a lot has been purchased upon which an academy of art will be erected. Johns Hopkins, a wealthy citizen, has deeded his residence and grounds near the city limits, on the Harford road, to trustees, to be held in trust after his death for a university, and has further provided for its liberal endowment.—From her several monuments, Baltimore is frequently designated as the "monumental city." In 1809 the legislature granted permission to erect a monument to George Washington. This was erected at the intersection of Charles and Monument streets, on a lot of ground given for the purpose by Col. John Eager Howard. It is a Doric column of white marble, rising from a base 50 ft. square and 35 ft. high. The shaft of the column is 160 ft. high, and is surmounted by a colossal statue of Washington 15 ft. high. The Battle monument is in the centre of Monument square, formed by the intersection of Calvert and Fayette streets. This is also



Washington Monument.

of white marble, and is 53 ft. high. It was erected to the memory of the citizens who fell in the defence of Baltimore, Sept. 12 and 13, 1814. It consists of a square base with a pedestal ornamented at each corner with a sculptured griffin. A fasciated column rises from the base, with bands, upon which are inscribed the names of those who perished. A statue representing the genius of Baltimore surmounts the column. On North Broadway a plain marble pediment and shaft, surmounted by a statue of Thomas Wildey, commemorates the founder of the order of Odd Fellows in the United States.—The bank of Maryland was established in 1790. The failure of this institution in 1834 caused riots in the succeeding year, when the mob sacked several houses belonging to prominent directors of the bank. In 1792 a branch of the United States bank was established in Baltimore, the charter of which expired in 1835. In 1795 the bank of Baltimore was chartered; in 1804 the Union bank of Maryland; in 1806 the Mechanics' bank; and in 1810 the Franklin, Marine, Farmers' and Merchants', and the Commercial and Farmers'. Other banking institutions were chartered subsequently, and there are now 14 national banks, with an aggregate capital of $11,241,985; 8 state banks, with $2,563,013; and 7 savings banks. There are 23 insurance companies, chiefly fire, with an aggregate capital of $3,501,585, besides numerous agencies. The city has 52 hotels, 9 markets, and 8 lines of city passenger railways.—Baltimore is divided into 20 wards, and is governed by a mayor and city council, consisting of 20 members in the first branch and 10 in the second. In 1769 the "Mechanical" fire company was organized, and purchased their first engine for $250. The paid fire department now comprises 9 engines and 3 hook and ladder companies. The expenses of the department for 1871 to Nov. 1 were $125,197 39. The fire inspector reports 156 fires within the city limits in the same period; loss, $475,394 87; loss by fire in 1870, $432,717 07. In connection with the fire department there is a fire alarm telegraph with 94 stations, ramifying to every portion of the city; its cost for 1871 was $15,249 84. The police force is governed by a board of three commissioners appointed by the legislature. Under this board are a marshal, deputy marshal, 4 captains, 8 lieutenants, and 489 uniformed patrolmen. The city is chiefly supplied with water from Roland lake, about 7 m. distant, and 225 ft. above tide. Mount Royal reservoir is near the N. limits of the city, 150 ft. above tide.—On July 4, 1828, the corner stone of the Baltimore and Ohio railroad was laid by Charles Carroll of Carrollton. This road now extends to Columbus, Ohio, a distance of 518 m., and is one of the grandest works of its kind in the world. The other railroads centring here are the Baltimore and Susquehanna, usually called the Northern Central; the Philadelphia, Wilmington, and Baltimore; the Washington branch of the Baltimore and Ohio; the Western Maryland; and the Baltimore and Potomac. The last-named road was opened for travel in 1872.

For the use of several of these railroads an immense tunnel traverses the city, with open cuts at intervals, from the western limits to tide water at Canton. There is also a railroad from Annapolis, the state capital, which joins the Washington branch road. The "Tide-water canal" has never proved productive; but the Chesapeake and Ohio canal has of late years been prosperous.—Baltimore suffered severely during the civil war, but since that time has rapidly increased both in population and commercial activity. Two lines of European steamers now start from her harbor; and through her two great arteries of traffic, the Baltimore and Ohio and the Northern Central railroads, this city is successfully competing for the trade of the west and northwest. The coasting trade is also extending. In 1871 there were inspected at Baltimore 137 steamers, with a tonnage of 40,752. Of the vessels trading to her port 398 were American, 358 British, and 53 North German. The total exports for 1871 were $18,000,000, an increase of nearly 50 per cent. over 1870. The principal articles exported were flour and meal, grain, tobacco, cotton, rosin, oil cake, petroleum, bacon, butter, cheese, and lard. The principal articles imported were coffee, sugar, guano, hides, iron, tin plates, cotton, flour, grain, and naval stores. The receipts of Cumberland coal for 1871 were 1,458,920 tons; of grain, 11,774,303 bushels; of cotton, 112,989 bales; of naval stores—spirits turpentine 22,852 bbls., rosin 79,352 bbls., tar 11,302 bbls., pitch 1,941 bbls. The inspections of flour were 1,123,028 bbls.; of tobacco, 49,571 hhds.; of leather, 352,646 sides. Importations of sugar, 126,619 hhds., 49,129 bags, 55,044 boxes; of coffee, 556,995 bags. The canning of oysters, fruits, and vegetables is estimated to reach the annual value of $5,000,000. The boot and shoe trade is also becoming one of importance. New cotton factories are building and old ones adding to their capacity; number of spindles in 1872, 137,000; number of bales of cotton used, from 40,000 to 50,000. The productive industry of Baltimore comprises 2,261 establishments, employing 28,178 hands, with a value in products of $51,106,278. The assessed value of property within the city limits, which is much below its real value, is $207,181,550. The debt of the city is $27,809,025 47. From this are to be deducted $12,023,006 25, on which the interest is provided for by various works of public improvement, and $10,786,888 16 invested in other productive investments; actual debt, $4,999,071 06; unproductive investments, $4,477,364 79.—It was not till 1729 that the assembly of Maryland passed an act entitled "An act for erecting a town on the north side of the Patapsco in Baltimore county," although settlements had been made at an earlier date, the first of which was by Charles Gorsuch, a Quaker, who in 1662 patented 50 acres of land on Whetstone Point, opposite the eastern section of the present city. In 1682 David Jones, the first settler on the N. side of the harbor, gave his name to the small stream which now divides Baltimore into "old town" and "new town." On Jan. 12, 1730, a town of 60 acres was laid out W. of Jones's falls, and called Baltimore in honor of Cecilius Calvert, Lord Baltimore. In the same year William Fell, a ship carpenter, having purchased a tract E. of the falls, called it Fell's Point. In 1732 a new town of 10 acres, in 20 lots, was laid out on the east of the falls, and called Jonestown, in honor of David Jones, the first settler. This name has long been forgotten, and as a settlement existed there before that of Baltimore, it was called "old town." Jonestown was united to Baltimore in 1745, dropping its own name, and two years afterward Baltimore, which properly lay up about the head of the "basin," near the foot of the present South Charles street, was extended as far eastwardly as Jones's falls, under an express provision that there was nothing in the act recognizing a right to "elect delegates to the assembly as representatives from the town." This was the earliest manifestation of that singular jealousy which has ever since been shown in the legislature by the Maryland county members against the city of Baltimore. In 1752 Baltimore contained but 25 houses and 200 inhabitants. In 1756 several of the unfortunate Acadians took refuge in Baltimore, and were hospitably received. The county town was removed from Joppa to Baltimore in 1767, and the courts and records were established there; during the next year provision was made for the erection of a court house and prison. The court house stood upon the site of the present Battle monument in Calvert street, but much higher, and the whipping post was to be seen adjoining till 1808, when the old court house was pulled down. In 1773 William Goddard began the first newspaper in Baltimore, entitled the "Maryland Journal and Baltimore Advertiser." In the same year communication was opened with Philadelphia by means of stage coaches and sailing packets, and a theatre was also erected on Albemarle street. In 1775 Baltimore contained 564 houses and 5,934 inhabitants. In 1776, Philadelphia having been taken by the British, congress established itself in Baltimore, in Jacob Fite's building, on the S. E. corner of Baltimore and Liberty streets. John Adams says of this building in his journal: "The congress sits in the last house at the west end of Market street (as Baltimore street was formerly called), on the south side of the street; a long chamber with two fireplaces, two large closets, and two doors. The house belongs to a Quaker, who built it for a tavern." The place where this "last house at the west end" once stood is now in the very heart of the city. In 1780 the first custom house in Baltimore was established; before that time all registers and clearances were obtained at Annapolis. In 1784 the first market house, which stood near the intersection of Market with Gay

street, having been found inadequate to supply the wants of an increasing population, was superseded by three new ones: the centre or Marsh market, the Hanover, and the Fell's Point market. At the same time, 1784, the streets were lighted with oil lamps, and three constables and 14 watchmen were appointed for the security of the town. At the close of the revolutionary war the commerce and trade of the city rapidly increased, and a large number of intelligent merchants settled here. Some of the most enterprising of these were from the north of Ireland, of Scotch descent, and by their exertions and wealth Baltimore became famed as a commercial port. Lines of packets and stage coaches were established for communication with points on the shores of Chesapeake bay, as well as in the interior of the state; in 1787 turnpikes were authorized to Washington, Frederick, and Reistertown, but were not fully completed till 1809. In 1789 the course of Jones's falls within the city, which ran along by the site of the present court house, was altered by cutting a new channel from Bath street to Gay street bridge, and the old bed of the stream was filled up. In 1792 a large number of refugees from Santo Domingo came to the city, where many of their descendants still reside. In 1796, the population being about 20,000, and the town having attained a high degree of prosperity, it was erected into a city, the corporation being styled "the mayor and city council of Baltimore," and James Calhoon was elected as the first mayor. Since that date the city has rapidly increased in population. On April 19, 1861, a body of federal troops, comprising a portion of the 6th Massachusetts regiment and the 7th Pennsylvania, while passing through Baltimore on their way to Washington, were attacked by a mob with missiles and firearms. In the conflict which ensued 9 citizens were killed and 3 wounded, and 2 soldiers were killed and 23 wounded. For several days great excitement prevailed in the city, which caused President Lincoln, at the instance of the mayor of Baltimore and the governor of Maryland, to issue an order that no more troops destined for Washington should be brought through Baltimore. Communication with the city and the removal of stores therefrom were suspended by order of the mayor and board of police. On May 13 Gen. Butler, who had taken possession of the Relay House on the 5th, with a body of federal troops, took military possession of Baltimore. He was succeeded by Gen. Banks, and on July 19 Gen. Dix assumed command of the troops stationed at Baltimore, and the city thenceforth remained peaceful and tranquil.

BALTIMORE, Lord. See CALVERT.

BALTIMORE BIRD, or Baltimore Oriole (*yphantes Baltimore*, Vieill.), a bird belonging to the family of *sturnidæ* (starlings), and peculiar to the American continent, which it inhabits from Canada to Brazil. It is the most beautiful of our summer visitors, and is universally admired, both for the richness of its plumage and the sweetness of its song. It is also called "golden robin," "hang bird," and "fire bird." The adult male has the head, neck all round, fore part of the back, wings, and tail, black; quills, excepting the first, margined with white; the whole under parts, the lesser wing coverts, and the posterior part of the back, bright orange, tinged with vermilion on the neck and breast; the tips of the two middle tail feathers, and the ends of the others, of a dull orange; bill and feet, light blue; iris, orange; length, 7¾ inches; extent of wings, 12 inches. This is the plumage of the third year, before which the colors are less bright, and more or less mixed with olive, brown, and white. The female is half an inch shorter, with the head, neck, and fore part of the back brownish black, mixed with dull yellow; hind part of the back light brownish yellow, brightest on the rump; lower parts duller than in

Baltimore Oriole.

the male. The orioles enter Louisiana, probably from Mexico, in early spring, and gradually make their way north, to return in autumn. Their motions are very lively and graceful. They are often seen clinging by the feet in search of insects, which form their principal food in the spring. Their song consists of from four to ten loud, full, and mellow notes, very agreeable to the ear. The nest is placed at the bottom of a very skilfully constructed network of strings and fibres, suspended, like a pouch, from the end of a branch, and shaded by overhanging leaves. The eggs are from four to six in number, about an inch long, of a pale brown color, spotted, dotted, and lined with dark brown. The period of incubation is 14 days. In Louisiana two broods are reared in a season. During migration their flight is high and straight, and mostly during the day. (See ORIOLE.)

BALTZER, Johann Baptist, a German Roman Catholic theologian, born at Andernach, July 16, 1803, died in Bonn, Oct. 1, 1871. He left the university of Bonn in 1827, was ordained in Cologne in 1829, received his diploma as doctor of divinity at Munich in 1830, and subsequently became professor at Breslau. He was a disciple of Hermes, but afterward inclined to the philosophical school of Anthon Günther. The holy see requested him to relinquish his professorship, but he would not resign, though he discontinued his lectures. His course was approved by the ecclesiastical authorities of Berlin, but his subsequent protest against the Vatican resulted in his suspension. In 1853 he went to Rome at the request of Cardinal Schwarzenberg for the purpose of preventing the proposed condemnation by the pope of Günther's writings. One of his early works is *Hinweisungen auf den Grundcharakter des Hermesischen Systems* (Bonn, 1832); and among his subsequent writings, indicating his partial conversion to Günther's teachings, is *Beiträge zur Vermittelung eines richtigen Urtheils über Katholicismus und Protestantismus* (2 vols., Breslau, 1839–'40).

BALTZER, Wilhelm Eduard, a German clergyman and author, born at Hohenleine, Prussia, Oct. 24, 1814. He studied in Leipsic and Halle, became a tutor, and was chaplain of the hospital of Delitzsch from 1841 till the beginning of 1847, when he founded at Nordhausen a free religious community, after having failed to have his nomination to various dioceses confirmed by the authorities. In 1848 he was elected to the Frankfort preliminary parliament, and afterward to the Prussian national assembly. He continues to preside over the community at Nordhausen (1873), and has acquired great influence by his sermons and publications. In 1868 he founded a society and a journal for the promotion of vegetarianism; and he published in 1870 on the same subject *Die sittliche Seite der naturgemässen Lebensweise.* His writings include *Das sogenannte Apostolische Glaubensbekenntniss* (Leipsic, 1847); *Allgemeine Religionsgeschichte* (Nordhausen, 1854); *Alte und neue Weltanschauung* (1852–'9); *Das Leben Jesu* (2d ed., 1861); *Von der Arbeit* (1864); *Das preussische Verfassungsbüchlein* (4th ed., 1864); *Gott, Welt und Mensch* (1869); and *Religionslehrbuch für Schule und Haus freier Gemeinden* (1st part, containing *Lehrbuch für den ersten Unterricht*, 2d ed., 1870).

BALUE, Jean de la, a French prelate and statesman, born at Verdun about 1422, died in Ancona in October, 1491. Having become a priest, he ingratiated himself with the bishop of Poitiers, became his executor, defrauded his heirs, trafficked in preferments, and succeeded in gaining the confidence of Louis XI., who made him secretary, almoner, bishop of Evreux, and eventually prime minister. About 1466 his efforts for the abolition of the "Pragmatic Sanction" gained for him from Pope Paul II. a cardinal's hat. Having been detected in a treasonable correspondence in 1469, the king confined him at the castle of Locle in an iron cage, from which he was released after 11 years at the solicitation of Pope Sixtus IV., who showered wealth and honors upon him and sent him as legate to Paris. Upon the death of Sixtus (1484) he fled from France, and Pope Innocent VIII. made him bishop successively of Albano and of Preneste, and protector of the order of Malta.

BALUFFI, Gaetano, an Italian prelate, born in Ancona, March 29, 1788, died in Imola, Nov. 11, 1866. He spent a considerable time as nuncio in South America, and is said to have been accompanied by the abbé Mastai Ferretti, afterward Pius IX., whom he succeeded as bishop of Imola, and was appointed cardinal Dec. 21, 1846, and archbishop in 1860. His "Religious History of America" (Rome, 1848) contains new and interesting documents, which he found chiefly at Bogotá. A French translation of his "Divinity of the Church manifested by its Charity, or Universal Outline of Roman Catholic Charity," was published in 1858 by the abbé Postel (2 vols., Paris).

BALUZE, Étienne, a French historian, born at Tulle, Dec. 24, 1630, died in Paris, July 28, 1718. He studied jurisprudence at Toulouse, where he became secretary of the archbishop. In 1667 Colbert made him his librarian, and in 1670 he was appointed professor of canon law in Paris, retaining these offices till 1700. Louis XIV. placed him in 1707 at the head of the royal college, but, displeased with his *Histoire générale de la maison d'Auvergne* (2 vols., 1708–'9), caused his work to be suppressed, threw him into prison, and confiscated his property. He was set at liberty in 1713, but did not recover his position. Besides 1,500 MSS. in the national library of Paris, he left 45 printed works, including *Regum Francorum Capitularia* (new ed., 2 vols., Paris, 1780), and *Miscellanea* (7 vols., 1678–1715; new ed., 4 vols., Lucca, 1761). He was a prominent champion of the liberties of the Gallican church, and his *Vies des papes d'Avignon* (2 vols., 1693) was placed on the Index by the Roman see. He rendered great services to literature by collecting authentic MSS., comparing them with printed editions, and publishing annotations full of erudition. His house was a favorite resort of scientific and literary men, whom he assisted in every way. He introduced the custom of long banquets for the promotion of intellectual intercourse, which became so fashionable during the 18th century.

BALZAC. I. Honoré de, a French novelist, born at Tours, May 16, 1799, died in Paris, Aug. 20, 1850. On leaving school he was placed in a notary's office. He soon became discontented with this position, and left it against the will of his father, to devote himself to literature. He had no facility in the art of composition, and his style was unformed. Before the age of 23, however, he had published half a dozen

novels and romances. These and many more in the next seven years, including attempts in almost all varieties of prose fiction, appeared under different assumed names, as Horace de St. Aubin, Lord R'hoone (anagram of Honoré), and Veillergré (pseudonyme of his collaborator Lepoiterin Saint-Alme). Abounding in defects of plot, incident, and style, they only give here and there a rare gleam of the excellent qualities that shine in his later writings. Some of them were writtten under the pressure of poverty, and merely to sell. Of their inferiority Balzac was always as conscious as his critics; nor would he consent that they should bear his name. The larger part of them have been reprinted since his death under the title of *Œuvres de jeunesse.* In 1826 he associated with himself a printer of the name of Barbier, for the purpose of carrying on an enterprise in which printing, publishing, and writing were combined, and paper-making was to have been added. It soon proved a lamentable failure, after having been long enough in operation to involve Balzac in debts that harassed him for years afterward, and from which in the end he relieved himself by the products of his pen. The first volume to which he signed his name was *Le dernier Chouan*, published in 1829, a historical novel, written in La Vendée, amid the scenes so faithfully described in its pages. His next work, *Physiologie du mariage*, drew public attention to the originality and subtlety of the author's genius; *La peau de chagrin*, in 1831 (included in his *Contes philosophiques*), increased the general admiration. From this time to the close of his life he continued to produce in rapid succession that remarkable series of romances, novels, and tales to which he gave the general title of *Comédie humaine*, including his celebrated *Scènes de la vie privée*, *Scènes de la vie de province*, *Scènes de la vie parisienne*, &c.; *Études philosophiques*, and *Études analytiques*. He proposed to himself nothing less than the complete delineation of every phase of modern French society. This great work, with all its natural limitations and manifold defects of execution, yet remains a marvellous monument of genius and industry. Portions of it considered as independent works, such as *Eugénie Grandet*, *César Birotteau*, *Le père Goriot*, and *Les illusions perdues*, are masterpieces in themselves. Among his other works are: *La fille aux yeux d'or; Mémoires de deux jeunes mariées; Les parents pauvres; Le contrat de mariage; Vautrin;* and *Contes drôlatiques*. According to his sister, between 1827 and 1848 he wrote 97 works, containing nearly 11,000 pages, and thrice as large as ordinary octavo volumes. Most of his works have been translated into the principal foreign languages. Among the many biographies of him, the most interesting are those by his sister Laure and Théophile Gautier (Paris, 1859). His best works are distinguished for depth, acuteness, and boldness of observation, but his minute accuracy of external description and fulness of detail often become wearisome, clog the movement of the story, and detract from the interest that should centre round the main figures. He is sometimes gross even to cynicism, which he mingles with traits of exquisite purity and delicacy; but both the grossness and delicacy generally reside in his subjects. He rarely projects his own personality. It has been regretted that he had no high ideal; but that did not enter into his system of art. He aimed only to present the realities of life. He advances no theory, pretends to no moral teaching. Treating largely of female emotions, he found among women his warmest admirers. On occasion of the publication of his *Médecin de campagne* in 1835, he received a complimentary letter from the countess Evelina Hanska, a Polish lady, which was the commencement of a long and intimate correspondence. After her husband's death, Balzac went to Poland and married her (1848). His health was already seriously impaired by excessive work and by drinking coffee in large quantities as an habitual stimulus. A few months after his return from Poland, and after having fitted up his house in the rue Fortunée (Champs Élysées) with exquisite works of art for a permanent residence, he died of hypertrophy of the heart, and was buried at Père Lachaise, amid an immense concourse of people, Victor Hugo pronouncing the funeral oration. **II. Laure de,** sister and biographer of the preceding, born in 1800. She married M. Allain, surnamed Surville, an engineer. She wrote fairy tales and other stories for her children, which have acquired great popularity. Her brother's novel, *Un début dans la vie* (1842), was founded upon one of her tales entitled *Le voyage en Coucou.* She published in 1858 *Balzac, sa vie et ses œuvres*, containing his correspondence and many interesting details of his life.

BALZAC, Jean Louis Guez, seigneur de, a French writer, born in Angoulême in 1594, died at Balzac, Feb. 18, 1654. His father, a nobleman of Languedoc, and a favorite of Henry IV., assumed the name of De Balzac after a small estate on the Charente. He was a pupil of Malherbe, accompanied Cardinal de la Valette to Italy, and became his agent in Rome; and on his return to Paris, when his correspondence had established for him a high literary reputation, he became one of the most admired visitors of the hôtel Rambouillet, a favorite of the bishop of Luçon, afterward Cardinal Richelieu, and a member of the newly established French academy. His rapid success excited much jealousy, especially among the old school of prose writers and the order of the Feuillants, whose general, Father Goulu, published a most virulent attack upon him. Balzac, weary of these assaults, left Paris for his country seat, and was hence called the hermit of the Charente. Toward the end of his life he often retired for religious meditation to the Capuchin convent of Angoulême, where he had two rooms built for his own use. He distributed large amounts among the poor, and be-

queathed funds to the academy for an annual prize in rhetoric, which is still distributed. He was greatly admired by Christina of Sweden, to whom he dedicated his *Aristippe*. His *Prince*, a fulsome eulogy of Louis XIII., and written in the pompous style characteristic of *Le Socrate chrétien* and of most of his works, was censured by the Sorbonne. He contributed much, however, to improve prose writing, especially by his *Lettres* (new ed., 3 vols., Paris, 1806). A complete edition of his writings by Cassaigne in 2 vols. folio appeared in Paris in 1665, and a select edition by A. Malitourne in 2 vols. 8vo in 1822. D. F. Moreau de Mersan published *Pensées de Balzac* in 1807. About 200 of his MS. letters to Chapelain have lately been published by the committee of historical monuments, and included in a volume entitled *Mélanges*.

BAMBARRA, a district in the N. W. central part of Africa, between lat. 10° and 15° N. and lon. 6° and 9° W. The eastern part is a nearly level plain, subject to overflow by the rivers, which turn a considerable portion of it into marsh. The western portion is hilly, and includes the eastern sides of the Kong mountains. The climate is sultry except in the hilly portions. The rainy season begins in the middle of June, and continues with violent winds and thunder until November. The principal river is the Joliba or Niger, which descends from the mountains near the western boundary. Numerous villages lie upon the banks of this stream. Bambarra produces a great variety of garden vegetables; the indigo plant, which grows spontaneously; the butter tree, which yields an ash-gray butter, an article of trade; and some singular fruits, one of which, the *rhamnus lotus*, is acid in taste and resembles gingerbread in color. Many districts have extensive forests and fine pastures. Horned cattle, sheep, goats, and horses of a fine breed are numerous. Poultry abounds. The rivers supply an abundance of fish, which, when dried, is an article of considerable trade. The aborigines, who are the peasantry of the country, are barbarous. The Moors, who have established themselves in the towns along the Joliba, exercise a great degree of authority with the petty sovereigns of the country, and with the Mandingoes and Foolahs, two large negro tribes from the Kong mountains, who are Moslems. They compose the great part of the population of the towns, and are mechanics and merchants. The towns inhabited by these tribes and the Moors are independent of the rule of the petty independent chiefs. Bambarra has a very active trade. The Mandingoes export ivory. The Moors carry on extensive commerce through the Sahara with the countries along the Mediterranean. Besides gold, the principal articles of commerce are slaves, ivory, and coarse cotton cloth, which are exchanged for salt from the desert, tobacco, hardware, &c. Chief town, Sego; other important towns, Bammakoo, Nyamina, and Sansanding.

BAMBERG, a town of Bavaria, in the circle of Upper Franconia, on the Ludwig's canal and the river Regnitz, about 4 m. above its confluence with the Main, 33 m. N. N. W. of Nuremberg; pop. in 1871, 25,748, including 3,000 in the garrison. The inhabitants are chiefly Roman Catholics. The town is well built on eminences in a delightful and fertile region, and is divided by the Regnitz, which is crossed by five bridges. The ditches of the old ramparts have been converted into gardens and promenades, the finest of the latter being the parks of the Theresienhain on the Ludwig's canal. The most remarkable public buildings are the cathedral, one of the finest in Germany, rebuilt in Byzantine style, with monuments of the emperor Henry II. and his consort Cunigunda and of Pope Clement II., and with paintings by Tintoretto and Vandyke; and the former university and present parish church of St. Martin, built by the Jesuits at the end of the 17th century, noted for its internal beauty, with a college and library. The collegiate church of St. Stephen is Protestant. The town contains an infirmary founded by Bishop Erthal, several medical schools, and a botanical garden; a lyceum, once a university and afterward an academical gymnasium, with complete courses of theology, philosophy, and medical science; a normal school, and many other schools. The royal library contains nearly 60,000 volumes, and there are many learned, artistic, and philanthropical institutions and associations. The principal corporation is that of the gardeners, with over 700 members and a triennial prize for officinal plants. The export of plants, vegetables, fruits, and seeds, and especially of licorice, is considerable. There are over 60 breweries. Cotton weaving employs over 1,500 persons. The transit trade has been much increased by railways as well as by the Ludwig's canal, which, extending from the Regnitz to the Altmühl, unites the Main, and through it the Rhine, with the Danube. The view from the ruined castle of Altenberg is among the finest in Franconia. The town is supposed to have derived its name and origin in the 9th century from this castle of the counts of Babenberg, where Philip of Swabia, the competitor of Otho IV. for the crown of Germany, was murdered in 1208 by Otto of Wittelsbach. Bamberg was formerly an independent bishopric; the 61st and last prince-bishop, Buseck, who died in 1805, retired with a pension of 40,000 florins after the secularization of the see in 1801. The bishopric then included an area of 1,400 sq. m. and a population of 200,000. It is now an archbishopric, with jurisdiction over the bishoprics of Würzburg, Eichstädt, and Spire. The Bamberg conferences of 1854 related to the addition of the middle German states to the Austro-Prussian union.

BAMBOCCIO (little child, or simpleton), the Italian nickname of Pieter van Laer or Laar, a Dutch painter, so called either from his funny

appearance (according to some accounts he was a cripple), or because he chose his subjects from low life (*bambocciate*), born at Laaren, near Naarden in 1613, died in Haarlem in 1673. He spent 16 years in Rome, living and working with Poussin and Claude Lorraine, and acquiring celebrity by his pictures of the wild haunts of robbers, of mobs at public gatherings and festivals, and other delineations of low life in Rome and its vicinity. In such subjects he was the best artist of his day, but Wouverman's superior finish was said to have affected him to such a degree that he killed himself. Many of his pictures are in Vienna, Augsburg, and Florence. He etched plates from his own designs, and excelled as a violinist.

BAMBOO (*bambusa arundinacea*), a genus of arborescent grasses found in Asia, and in the West Indies, but more extensively used in China than any other country. It has a hard woody texture where the plant has attained any considerable growth, with hollow jointed stems. These are externally coated with silex, and the plant sometimes secretes the same substance between the joints in lumps, when it is called *tabasheer*. The Chinese reckon an endless variety of it, one Chinese botanist observing that he could not name all the kinds, but would enumerate 63 of the principal varieties. The bamboo occupies an intermediate place between grasses proper and trees, from its size frequently appearing like a tree, but displaying gramineous affinities in its internal structure. Like all grasses, it is nourished from the pith, and starts from the ground at nearly the same

Bamboo.

diameter it bears in maturity. It usually grows to a height of 40 or 50 feet, and beyond that size is regarded as extraordinary. In diameter it varies from 1 to 8 inches, and in the distances between the joints from 4 to 6 inches in some varieties, and in others, highly prized, from 4 to 5 feet. The leaves are small and oval, without much diversity of form, but some-

Bamboo Leaves, Flowers, and Fruit.

times of a reddish and bluish hue. The color of the stems is generally yellow, but the Chinese possess secret arts of changing this to chestnut, black, &c.; the black bamboos are cultivated in the gardens of the rich like any other rare plants, and the emperor is said to have an officer connected with his palace whose sole duty is to attend to the bamboos in the imperial gardens. The culture varies greatly according to the soil, the exposure, and the variety of the plant. It generally requires a sandy soil, where the roots will easily penetrate, and it is extensively grown along the shores of rivers, partly to give support to the banks, although the plant dies if its roots touch the water. It is always propagated by suckers, for it requires 30 years or more to reach the blossoming period, when the plant produces a profuse quantity of seed and dies. Often all the mature bamboos in a large district flower at once and then die, only the rootstocks remaining to send up new shoots. The seeds are edible, and in 1812 a famine was averted in Orissa by the general flowering of this grass. In 1864 the bamboo flowered in the Soopa jungles, and about 50,000 people gathered the seed, camping in the jungle for several weeks. Planting generally takes place in the spring and autumn, and requires very slight care; four or five years elapse before a plantation is considered ready to cut, and for this the winter season is deemed the best, as the wood is then the hardest.—The bamboo may indeed be styled the national plant of China, and the uses to which it is put by the natives are almost innumerable. The young and tender shoots are boiled and eaten, or preserved by the confectioners, and as sweetmeats are delicious. The roots serve many curious purposes.

The tubes are in constant use in many departments of human industry; not only are entire houses and boats made of them in some cases, but various kinds of ornamental screenwork for interior decoration; also the yards of vessels and the tacking poles by which boats are impelled in calm and shallow waters. The straightest of the tubes have been used for astronomical purposes, and cheap aqueducts are in common use, formed by fitting the ends together. Sheds are made from the bamboo by softening it in water and flattening the sections, and these when split finer are made into rain cloaks. Floats to tie on the backs of little children who live in the boats on rivers, as well as the poles by which strong coolies carry burdens, come alike from the plant. Water wheels, fences, rope, chairs, tables, bookcases, boxes, hats, umbrellas, pipe sticks, fans, fan cases, cups, measures for grain, shields, pike and spear handles, and paper, all are formed from bamboo. The pith is used for lamp wicks, and exquisite carvings inlaid with gold and silver, and far more elegant than ivory work, are produced from the hard stems. From the large quantity of silex in the wood, thin slices make good knives. In the islands of the Indian ocean, the bamboo, like the breadfruit tree and the cocoanut, enters largely into the industrial arts of all the various races. The Battaks and the Redjangs of Sumatra write on small polished joints of bamboo, about one inch in diameter, beginning at the top and descending spirally to the bottom. In Burmah the bamboo is so extensively used in the construction of houses, that large cities, such as Rangoon and Prome, are composed almost entirely of bamboos. These houses are lashed together, not nailed, and easily struck and removed like tents.—The family *bambusaceæ* comprises 20 genera and 170 species already described. Of these only one is found in America north of Mexico, none in Europe, and but one is native to Africa; and only one is common to both hemispheres, differing in this respect from all other grasses.

BAMBOOK, a country in the interior of Africa, between lat. 12° 30′ and 14° 30′ N. and lon. 10° 30′ and 12° 15′ W. It is about 140 m. in length, and 90 in breadth. It is rugged, though the greatest elevation nowhere exceeds 600 ft., and is watered by the head streams of the Senegal. The higher region is barren and naked, but the lower supports an exuberant vegetation. The baobab, tamarind, and palm trees reach the greatest dimensions. The soil produces almost without culture maize, millet, cotton, melons, and a great variety of leguminous plants. Rice is yielded by the low lands, which are subject to overflow. Large herds of cattle roam over the plains. Lions and elephants are numerous. Bambook has rich gold mines, whose product is exchanged for salt. The inhabitants are Mandingoes of a very low type, and extremely numerous. Bambook was once invaded by the Portuguese, the ruins of whose forts and houses are still to be seen.

BAMIAN, Bamyan, or **Baumian,** a valley, pass, and ancient town of Afghanistan, about 60 m. W. N. W. of Cabool. The valley lies between the Hindoo Koosh and the mountains of Herat, and is important as the only route practicable for artillery across the Himalaya into Independent Turkistan. It is about 1 m. wide, 12 m. long, bounded on each side by almost perpendicular steeps, and crowded with remains of antiquity. The town occupies the sides of the detached Ghoolghoola hill, in the middle of the valley, the site of the old city of Ghoolghoola, destroyed by the Mongols under Genghis Khan in 1221. Among the relics are gigantic figures cut in the rock on the hill, and supposed to be idols, two of which are over 130 ft. high. There are vast caverns excavated in the rocks, extending in a series for upwards of 8 m. The highest elevation of the Bamian pass is about 8,500 ft., and further south are passes as high as 13,000 ft. About 8 m. W. of the town are the ruins of the castle of Zohak, believed to have originated from that mythical conqueror, and where coins and other relics were lately found.

BAMPTON LECTURES, a series of lectures or sermons preached before the university of Oxford since 1780, according to the will and endowment of the Rev. John Bampton, resident canon of the cathedral of Salisbury. The income of the endowment is £120 per annum. The Bampton lectures consist of eight annual discourses, for ever, on one or more of the following themes: 1. The divine authority of the Scriptures. 2. Divinity of Christ and of the Holy Ghost. 3. The articles of the Christian faith as comprehended in the Apostles' and the Nicene creeds. 4. The authority of the writings of the primitive fathers as to the faith and practice of the primitive church. 5. An essay to confirm the Christian faith, and confute all heretics and schismatics. One person is to be chosen annually, who is to deliver the annual course between the commencement of the last month in Lent term and the end of the third week in Act term. The lecturer is to be chosen by the heads of the colleges; he must have taken the degree of M. A. either from Oxford or Cambridge; is never to be chosen a second time; and the lectures are to be delivered in St. Mary's church. Within two months after the delivery of the lectures, 30 copies are to be printed for distribution to the universities, the mayor of Oxford, and the Bodleian library. They are, however, generally published.

BAN (Hun. *bán*, a corruption of the Slavic *pan*, lord), the title of the governor of Croatia and Slavonia; formerly also of the governors of various other provinces belonging to the Hungarian crown.

BAN, a proclamation; in old English and civil law, applied most commonly to an excommunication or curse publicly pronounced against those who had been or should be guilty of certain specified offences. In Germany sometimes persons, cities, or districts were placed under the ban of the empire by some public act or

proclamation, and thereby political rights and capacities were taken away, and in case of individuals they were cut off from society and deprived of rank, title, privileges, and property.—The ban and arrière ban of France was the entire feudal levy of the realm, raised by public proclamation (ban) of the king, denouncing penalties against all who should fail to appear. The ban comprised all the great vassals, holding of the king for homage; the arrière ban included all the vassals or tenants of the second class. The whole ban and arrière ban, therefore, constituted the entire military force of the crown of France during the feudal ages, and prior to the establishment of standing armies. It could only be called out by the king in person, and usually only when he was himself in the field, although the leading of it often was given to the constable, or some other high officer of France. The calling out of the ban and arrière ban usually implied the invasion of the soil of France; the revolt of some great feudatories; or, in some serious way, the supreme peril of the crown and state. It was attended with solemn ceremonies, and on the assemblage of the powers by the displaying of the *oriflamme*, or sacred banner of the monarchy, green, langued with tongues of gold, emblematical of the fiery tongues of the Pentecost, by the count d'Harcourt, who was the hereditary holder of that office.

BANANA (*musa*), the most important of tropical fruits, now common in the tropics of both hemispheres. When the cutting or shoot is planted (and it requires deep rich earth and much moisture to grow in perfection), it soon sends up two leaves, tightly rolled together until the green roll has grown two or three feet, when the blades unfold. These leaves are followed by others, until the stems of the leaves have formed a smooth trunk some eight or ten inches thick, composed wholly of the concentric leaf stems or petioles. At the end of nine months a deep purple bud appears in the centre of the leaves; its constantly lengthening stem soon pushes it beyond the leaves, and it hangs down like a huge heart. As the purple envelopes of the bud fall off rows of buds are disclosed, extending two thirds around the stem. Each miniature fruit has a waxen yellow blossom with a large projecting stigma at the end. The female flowers come first on the stem, and nearer the end are the smaller male flowers; both are full of good honey. Three or four months are required to ripen the fruit, and during the process the rows of male flowers have withered and dropped away, the ovaries of the female blossoms have swollen into bananas 6 to 14 inches long, and the huge bunch, containing several hundred fruits, hangs from the now withering plant, which soon dries up if left to itself. From its base spring up offshoots which may be transplanted, and if the stem is cut down as soon as the fruit is gathered, the round bulbous rootstock sends up new leaves, and a second plant matures much sooner than do the offshoots. Although most banana bunches hang down in maturity, a variety is found on the Society Islands whose very large bunches of deep orange-colored fruit stand up erect, forming ornamental rather than useful objects; for their taste even when cooked is acrid and disagreeable. The Brazilian banana is tall, rising to a height of 15 or even 20 feet, and the fruit is yellow and excellent, rather vinous in flavor. The Chinese banana seldom exceeds five feet in height, the leaves of a silver hue, and the fruit aromatic. The *fei* or Tahitian banana is similar to the Brazilian, but not so tall, and the fruit is angular, yellow, turning black when fully ripe, and the flesh is salmon-colored or buff, and slightly acid. A variety with a red skin is brought from the West Indies, and a very small banana is found in Africa and the East Indies. The botanical distinction of species is probably not well founded, as at present two, *M. sapientum* and *M. paradisiaca*, are supposed to comprise all the edible varieties; and the popular names banana and plantain are often confounded, the latter being applied to the cooking varieties. Usually no seeds are found in the pulp, but at Akyab and along the coast of Arracan a kind is common full of seeds. These seeds are black, rough, as large as cotton seeds, and like these enveloped in a fibrous coat. The Spaniards, from the fancied resemblance of the transverse section to a cross, supposed the banana to have been the forbidden fruit, and that Adam saw in eating it the mystery of redemption by the cross. Bananas are eaten raw, either alone or cut in slices and with sugar and cream or wine and orange juice. Cooked when green or ripe, they are fried alone or in butter, baked with the skins on, or made into puddings or pies. They may be cut into strips and dried, or pounded into a paste; in the latter form they are the staple food of many

Banana.

Mexican tribes. The amount of nourishment is very great, and Humboldt states that the same land which produces 1,000 lbs. of potatoes will yield 44,000 lbs. of bananas; a surface bearing wheat enough to feed one man will, when planted with bananas, feed 25. The young shoots are cooked as greens, but the old leaves (from 6 to 10 ft. long and 12 to 14 in. wide) and stem are full of a watery, acrid juice, which stains white cloth an indelible black or dark brown. The fibres of the leaves make a textile fabric of great beauty, known as a fine kind of grass cloth. The plants are set closely in cultivation, and the bunches are gathered before they are quite ripe and hung up in a cold place, or better still, buried in the earth. A plantation will yield all the year round by timing the planting, but the crop is much more abundant at one season. The bunches may weigh 80 or even 100 lbs. when ripe.

BANANA ISLANDS, three small islands on the coast of Africa, 30 m. S. W. of Sierra Leone, near Cape Shilling, named after the largest, 4 m. long and 1 m. broad; lat. 8° 8′ N., lon. 13° 12′ W. They are high, fertile, inhabited, and visited from Sierra Leone on account of the salubrity of the climate. The Rev. John Newton, the friend of Cowper, spent some time here in the service of a slave-dealer.

BANANAL, an island in the river Araguay, province of Goyaz, Brazil, also known as Santa Anna. It is 200 m. long by 35 broad, covered with a dense forest, and said to have in its centre a navigable lake, 90 m. long by 30 wide. It is very fertile, and derives its name from the increase of the banana plants introduced by its discoverer in 1773. There are several Brazilian villages of the same name.

BANAT (Hun. *Bánság*, a district governed by a ban), a part of S. Hungary, comprising the counties of Torontál, Temes, and Krassó, and, in a wider sense, the divisions of the Military Frontier adjoining these counties, thus bounded W. by the Theiss, S. by the Danube, N. by the Maros, and E. by the mountain ranges which separate Hungary from Wallachia and Transylvania; area, in the wider sense, about 12,000 sq. m.; pop. about 1,300,000, including Magyars, Germans, Wallachs, Rascians or Serbs, Jews, Bulgarians, and gypsies. About one third of the Banat is very hilly, the rest level, and in parts swampy. The interior is well watered by the Temes, Karas, and Bega. The Bega canal, nearly 90 m. long, is within the district. The Banat, though not unfrequently visited by both droughts and inundations, is one of the most fertile regions of Europe, especially in wheat, maize, millet, tobacco, sumach, and fruit. Excellent wine is produced in moderate quantities; game and fish are plentiful. The minerals include iron, copper, and also some gold, silver, and zinc; coal, however, is the principal mineral production. The Romans formed several settlements in the Banat, on account of the mild climate. Devastated by the Turks, it was wrested from them in 1716 by the Austrians, who governed it for some time as a military district, Temesvár being its capital. The Banat proper was separated from Hungary in 1849 to form with the county of Bács a new Austrian crownland under the name of Voivodina or Serb waywodeship of Banat of Temes; but it was reunited to the kingdom in 1860. In the summer of 1872 the Banat was desolated by inundations of uncommon magnitude.

BANBURY, a market and borough town in Oxfordshire, England, on the river Cherwell, 65 m. N. W. of London; pop. in 1871, 4,106. It has a considerable trade. The manufacture of agricultural implements has become important, and the town has much improved within 20 years. The large church is an imitation of St. Paul's cathedral. Banbury tarts and Banbury cheese are famous all over England.

BANCA, an island of the Malay archipelago, between lat. 1° 30′ and 3° 8′ S., and lon. 105° 9′ and 106° 51′ E., bounded N. and E. by the China sea, S. by the Java sea, and on the W. separated from Sumatra by the strait of Banca, 135 m. long, one of the chief highways of European commerce in the eastern seas; area, about 5,000 sq. m.; pop. in 1869, 59,000, including about 22,000 Chinese and 150 Europeans. Banca is chiefly known by its inexhaustible tin mines, the annual product of which was estimated in 1872 at about 9,000,000 pounds, chiefly exported from Batavia. The digging, washing, and smelting of the alluvial tin ore are entirely in the hands of the Chinese population, who receive advances from the Dutch government, which exercises a monopoly of the produce. Of the indigenous population, about one third are the *orang gunung*, mountain men, savages whom the Dutch have not been able to civilize to any extent. They are scattered about in separate families, and subsist chiefly upon the spontaneous products of the forest and the meat of wild hogs. On the coast are the Sikas tribes, similar to the Bajaus or sea gypsies in habits, though differing from them in language. They dwell in boats and live by fishing and piracy. The Chinese are subjected to severe restrictions by the government, and none are allowed to remain beyond a certain period. The Chinese fleet arrives with the N. W. monsoon, with sometimes 2,000 and 3,000 coolies. They are directly governed by their *kapallas*, or captains, as in other parts of the archipelago, who are appointed by the government. The island is crossed by a chain of mountains, the highest peak of which is about 2,800 ft. high. This chain has the same direction as that of the Malay peninsula, and of the plutonic part of Sumatra, running from N. W. to S. E., and the same geological formation. The main component of the mountains is granite, containing tin, gold, and iron. Next to the granite, and in situations of less elevation, there occurs an extensive formation of red ironstone, the laterite of geologists, and in the lowest lands an alluvial formation,

intermixed with sandstone and breccias, among which occur the washings of tin and gold The soil of Banca is decidedly sterile. Besides tin mining, the only industry consists in the limited cultivation of rice and of a few fruits and vegetables. The whole island is covered with forests, the marshy parts being impenetrable. The most valuable products of the forest for trade are eaglewood, ebony, and chiefly beeswax. Of animals, there are two species of wild hog, the same as those of Java, which are very numerous, a stag, the pigmy deer or kanchil, and the Malayan bear. The principal port is Minto or Muntok, formerly the seat of the Dutch governor (who now resides at Banca Kota), and of a small garrison; it is situated on the shore of the safest roadstead on the straits of Banca, in lat. 2° S., lon. 105° 5′ E., and contains about 3,000 inhabitants, chiefly Chinese.—This island attracted no attention till the discovery of its tin in 1709. The sultan of Palembang endeavored to establish a monopoly of it; but the Dutch sent an expedition to force a treaty upon him, securing to themselves the right of preëmption at a very small price. The island was occupied by the English during the Napoleonic reign in Holland, but restored to the Dutch after the restoration of the house of Orange. The Dutch in 1818 restored the old sultan Badr-Oodin, whose treachery brought on a bloody war of two years, ending in 1821 with the triumph of the Dutch, who have since held the island.

BANCROFT, Aaron, an American clergyman, born in Reading, Mass., Nov. 10, 1755, died in Worcester, Mass., Aug. 19, 1839. He was educated in the Calvinistic system, but was subsequently led to a belief more nearly resembling that of Arminius, Grotius, and Locke. When the American revolution broke out, he often took a place in a company of "minute men," and, though then a collegian, was a volunteer at Lexington and Bunker Hill. He graduated at Harvard college, studied theology, and began at once to preach. Of the next five years of his life, three were passed in Nova Scotia. In 1785 he was settled permanently in Worcester. Besides occasional sermons, chiefly in defence of religious liberty, he printed in 1800 a eulogy on Washington, and in 1807 a life of Washington, which was reprinted in England in 1808, and has been very widely circulated in the United States. In 1822 he published a volume of doctrinal sermons, directed chiefly against the dogma of unconditional election. His protest against Calvinism long preceded the rise of the Unitarians, and though in the latter part of his life he was president of the American Unitarian association, he would never discard the name or the system of Congregationalism. He was a doctor of divinity of Harvard college.

BANCROFT, Edward, an English naturalist and physician, died in 1821. He resided long in America, where he was intimately associated with Franklin and Priestley. He wrote an "Essay on the Natural History of Guiana" (London, 1769), which contained much information at that time new, particularly an account of the woorali, or vegetable substance employed by the Indians to poison their arrows. He also published "Experimental Researches concerning Permanent Colors, and the Best Means of Procuring them" (2 vols. 8vo, 2d ed., London, 1813), which was translated into German.

BANCROFT, George, an American historian and statesman, son of the Rev. Aaron Bancroft, born in Worcester, Mass., Oct. 3, 1800. He pursued his preparatory studies at Exeter, N. H., and in 1813 entered Harvard college, where he gave special attention to metaphysics and morals, and acquired a strong predilection for the writings of Plato. He graduated in 1817, and almost immediately started for the universities of Germany. In Göttingen, where he remained for two years, he studied under the most learned professors of the time, including Eichhorn, Heeren, and Blumenbach, with nearly all of whom he had close personal acquaintance. He applied himself to German, French, and Italian literature, the oriental languages and the interpretation of the Scriptures, ecclesiastical and other ancient history, natural history, the antiquities and literature of Greece and Rome, besides pursuing a thorough course of Greek philosophy. He selected history as his special branch of study. Having received at Göttingen in 1820 the degree of doctor of philosophy, he repaired to Berlin, where he continued his studies, and became intimate with Schleiermacher, Wilhelm von Humboldt, Savigny, Lappenberg, Varnhagen von Ense, and other distinguished literary persons. He also carefully observed the administration of the Prussian government in many of its departments. In the spring of 1821 he began a journey through Germany and other parts of Europe. He had already in a Göttingen vacation seen Dresden, and had made the acquaintance of Goethe at Jena. At Heidelberg he spent some time in study with the historian Schlosser. In Paris he became acquainted with Cousin, Alexander von Humboldt, and Benjamin Constant. He passed a month in England, travelled on foot through Switzerland, and spent eight months in Italy, forming an acquaintance with Manzoni at Milan, and a friendship with Chevalier Bunsen at Rome, where he also knew Niebuhr. In 1822 he returned to America, and accepted for one year the office of tutor of Greek in Harvard university. During this year he preached several sermons, yet he seems not long to have entertained the thought of entering the clerical profession. In 1823, in conjunction with Dr. Joseph G. Cogswell, he established the Round Hill school at Northampton. He published at this time his translation of Heeren's "Politics of Ancient Greece," and a small volume of poems, and he was also busily meditating and collecting materials for a history of the United States. In 1826 he delivered at Northampton an oration, in which he avowed

his principles to be for universal suffrage and uncompromising democracy. He was elected in 1830, without his knowledge, to the legislature of Massachusetts, but refused to take his seat, and the year after he declined a nomination, though certain to have been elected, for the senate of his state. In 1834 appeared the first volume of his "History of the United States." In 1835 he drafted an address to the people of Massachusetts, at the request of the young men's democratic convention, and was for a time actively engaged in political speaking, and in drawing up resolutions and addresses. He removed in this year to Springfield, where he resided three years, and completed the second volume of his history. In 1838 he was appointed by President Van Buren collector of Boston. Duties were at that time paid by bonds, and unpaid bonds had accumulated to a large amount as debts to the government; but not a single bond taken during the term of Mr. Bancroft was unpaid at the time when he resigned the office, and his collections amounted to several millions. He was at this period a frequent orator in political assemblies, was pursuing his studies zealously, and was particularly interested in the philosophical movement subsequently known as transcendentalism. In 1840 the third volume of his history was published. In 1844 he was nominated by the democratic party for governor of Massachusetts, and, though not elected, received more votes than any candidate has received either before or since on the purely democratic ticket. During the canvass he was in the city of New York, studying manuscripts and documents illustrative of our early history. After the accession of Mr. Polk to the presidency in 1845, Mr. Bancroft entered the cabinet as secretary of the navy. He signalized his administration of this office by the establishment of the naval academy at Annapolis. The improvement of education in the navy had been desired by some of his predecessors, but little had been done to promote it, and Mr. Bancroft was the first to design a school for the naval service, corresponding to the military school at West Point. At his request the secretary of war, with the approval of the president, made over to the navy department the military fort and grounds at Annapolis, and the school was at once set at work by Mr. Bancroft, who received for the purpose all the appropriations for which he asked. He was also influential in obtaining additional appropriations for the Washington observatory, and in introducing some new professors of great merit into the corps of instructors. A reform in the system of promotion in the naval service being required by many, he planned a method by which promotion should depend not on age alone, but also on experience and capacity; but his scheme was never fully developed or applied. While secretary of the navy Mr. Bancroft gave the order to take possession of California, and it was carried into effect before he left the naval department. During his term of office he also acted as secretary of war *pro tem.* for a month, and gave the order to Gen. Taylor to march into Texas, which caused the first occupation of Texas by the United States. In 1846 Mr. Bancroft exchanged his position in the cabinet for the office of minister plenipotentiary to Great Britain. He successfully urged upon the British ministry the adoption of more liberal laws of navigation. The arrest of some Irish Americans gave him an opportunity also to vindicate the rights of naturalized American citizens; and at his demand they were set free. During his residence in England he made many friends among the men of letters of that country. In 1849 the university of Oxford made him a doctor of civil law, and he had before been chosen correspondent of the royal academy of Berlin, and also of the French institute. He used the opportunity of his residence in Europe to perfect his collections on American history. He made several visits to Paris, to study the archives and libraries of that city, being aided in his researches by Guizot, Mignet, Lamartine, and De Tocqueville. In England the ministry opened to him the records of the state paper office, embracing a vast array of military and civil correspondence, and also the records of the treasury. In the British museum, also, and in private collections, he found valuable manuscripts. He returned to the United States in 1849, took up his residence in New York, and began to prepare for the press the fourth and fifth volumes of his history, which were published in 1852. The sixth volume was issued in 1854, the seventh in 1858, and the eighth soon after. Up to 1866 he declined any public office, though several were tendered him, and resided in New York, engaged in literary labor. In February of that year, at the request of Congress, he delivered an address in memory of Abraham Lincoln. The ninth volume of his history also appeared during that year. On May 14, 1867, he was appointed minister to Prussia, and accepted the office; in 1868 he was accredited to the North German confederation, and in 1871 to the German empire. Under his auspices, important treaties concerning the naturalization of Germans in America were concluded with the various states of the confederation in February, 1868. In August of the same year Mr. Bancroft received from the university of Bonn the honorary degree of Doctor Juris, and in September, 1870, he celebrated the 50th anniversary of receiving his first degree at Göttingen. On this occasion he was congratulated by many German societies and faculties, as well as by prominent men of several nations. He still gives much of his time to labor on his unfinished "History of the United States," and has the tenth and last volume nearly ready for the press (1873). Mr. Bancroft is a member of many American and foreign learned societies. Besides the works mentioned above, he has published numerous essays in the "North

American Review" and other periodicals, a collection of which has been made under the title of "Miscellanies" (New York, 1855). Mr. Bancroft's "History of the United States" occupies a very prominent place not only in the historical literature of his own country, but in that of the world, since it is everywhere a recognized authority concerning the period which it covers. It is not merely a narrative, but a philosophic treatise, dealing with causes and principles as well as events, and tracing with remarkable skill the progress of enlightenment and liberal ideas. It has been translated into various languages, and is especially popular in Germany.

BANCROFT, Richard, an English prelate, born at Farnworth in September, 1544, died in London, Nov. 2, 1610. He was chaplain to Sir Christopher Hatton, and afterward to Archbishop Whitgift, through whose and Lord Burleigh's influence Elizabeth nominated him in 1597 bishop of London. The queen employed him in 1600 on a diplomatic mission to Germany, and he attended on her deathbed. James I. promoted him in 1604 to the archbishopric of Canterbury. For nearly a generation he preached against popery; took a prominent part in the disputation before James at Hampton Court between the church of England and the Presbyterian or Puritan party, the measures of the government being afterward formed according to his views; became one of the commissioners for regulating the affairs of the established church and repressing the publication of obnoxious works; and was a member of the privy council, and shortly before his death chancellor of Oxford. He published in 1593 "Dangerous Positions and Proceedings, published and practised within this Island of Brytaine, under Pretence of Reformation, and for the Presbyteriall Discipline," and "A Survey of the pretended Holy Discipline."

BANDA ISLANDS, a cluster of ten small islands belonging to Holland, in the Molucca group of the Eastern archipelago, in the Banda sea, about 50 m. S. of Ceram, between lat. 3° 50′ and 4° 30′ S., and lon. 128° 30′ and 130° E.; area, about 130 sq. m.; pop. about 6,000, including Papua negroes, Chinese, and Dutch. About 800 of the natives are Christians. Lontoar, or Great Banda, the largest of the group, is about 12 m. long and 2½ m. wide. It is almost uninhabitable on account of unhealthiness. Neira, or Banda Neira, 120 m. E. S. E. of Amboyna, is the seat of the Dutch authorities, and contains the forts Nassau and Voorzigtigheid, and the old castle Belgica, a good harbor, and extensive stores. The Gonong Api or Fire mountains, N. of Banda Neira, derive their name from the volcanic cone Api (fire), about 2,000 ft. high, which constantly emits smoke and sometimes cinders and ashes. There have been many disastrous eruptions, and in 1852 an earthquake caused great loss of life and property, and obliged the inhabitants to seek refuge in Amboyna. The chief value of the islands is for the production of nutmegs. The plantations, which cannot be divided or sold, were worked by slaves until the proclamation of emancipation, Jan. 1, 1860, since which time they have been cultivated partly by Java convicts. The number of persons employed exceeds 2,500, and the trade is virtually monopolized by the Dutch East India company. The annual average production is estimated at 700,000 lbs. of nutmegs and 180,000 lbs. of mace. Sago and cacao are also produced.—The islands were discovered in 1512 by Antonio Abreu, a Portuguese, whose countrymen seized them in 1524, but were expelled in 1600 by the Dutch. Shortly afterward the Dutch ordered the wholesale execution of the indigenous Malay settlers for the murder of Admiral Verhoeven and 45 naval officers. The English conquered them March 8, 1796, restored them to the Netherlands after the peace of Amiens in 1801, and reoccupied them from 1810 to 1814; but the final restoration to the Dutch authorities was delayed till 1817, owing to a difference respecting the partition of the expenditures which had accrued in the interval.

BANDA ORIENTAL. See URUGUAY.

BANDARRA, Gonzalo Annes, surnamed the Portuguese Nostradamus, born at Trancoso, province of Beira, died in Lisbon in 1556. He was a cobbler, addicted to improvising religious verses and prophecies, and was in 1541 persecuted by the inquisition, but allowed to return to his trade. A clandestine edition of what purported to be his improvisations (*Trovas redondilhas*) was printed in 1581; this has been regarded as spurious, and a rival edition appeared in Paris in 1603. A Portuguese missionary in Brazil, Antonio Vieyra, was visited with severe punishment by the inquisition for predicting the resurrection and triumphant reign of John IV., in accordance with Bandarra's prophecies of a fifth empire of the world. This led to new editions of the predictions, especially one issued in Nantes, and they have been associated with the sect of the Sebastianists, who had many followers at the time of the French invasion, and who from a mystical interpretation of these prophecies predicted the return of King Sebastian to the throne for 1808. Bandarra having been altogether illiterate, the work ascribed to him must have been penned by another hand. Writers of the 17th century called him the holy cobbler (*o sapateiro santo*).

BANDEL, Joseph Ernst von, a German sculptor, born at Anspach, May 17, 1800. He studied at Nuremberg, Munich, and Rome, and is best known for his colossal national monument of the German hero Arminius, on the summit of the Grotenberg, near Detmold. The statue is of copper, 95 feet high. The work was begun in 1838, and suspended for want of funds, after a Gothic temple had been erected for the pedestal, and the statue itself had been made in detached pieces. An association was formed in 1862 for the collection of subscriptions. The king of Prussia in 1869 contributed 2,000 tha-

lers, but more money is required for the completion of the work. In the delicacy and elegance of his works in marble, Bandel is hardly inferior to Canova. Among his best works are statues of Shakespeare and Goldoni for the Hanover theatre.

BANDELLO, Matteo, an Italian novelist, born at Castelnuovo Scrivia, near Alessandria, in 1480, died in Agen, France, about 1562. He was a Dominican, accompanied his uncle, general of this order, on his travels in Italy, and was teacher in Milan of Lucrezia Gonzaga, whom he celebrated in his *Canti della lode della S. Lucrezia Gonzaga* (Agen, 1545). In 1525, having sided with the French, he had to fly from Milan, and found an asylum with Cesare Fregoso, an Italian general in the French service, after whose death he remained an inmate of his family at Agen. Appointed in 1550 by the king of France bishop of Agen, he accepted part of the emolument of this office, its duties being discharged by the bishop of Grasse, while he prepared for publication his *Novelle*, or tales, the MSS. of which had been recovered by his friends from the incendiaries of his Milanese residence. They were used by Shakespeare in "Romeo and Juliet," "Twelfth Night," and "Much Ado about Nothing;" by Massinger in his "Picture;" and by Beaumont and Fletcher in "The Maid of the Mill" and "The Triumph of Death." He translated the Hecuba of Euripides, and wrote poetry (*Rime*, Turin, 1816); but his fame rests on his *Novelle*, published at Lucca in 3 vols., 1554 (4th vol., Lyons, 1573); more complete editions are those of London (4 vols., 1740; 9 vols., 1791–'3) and Milan (9 vols., 1813–'14). The most recent Italian edition is that of Turin (4 vols., 1853).

BANDERA, a S. W. county of Texas, watered by the Rio Medina; area, 938 sq. m.; pop. in 1870, 649, of whom 18 were colored. Stock raising is the principal industry. Sheep and cattle are easily raised, and hogs thrive on the mast, which is abundant. The chief productions in 1870 were 15,673 bushels of Indian corn, 5,530 lbs. of wool, and 9,095 of butter. There were 281 horses, 898 milch cows, 5,103 other cattle, 3,208 sheep, and 856 swine. Capital, Bandera City.

BANDETTINI, Teresa, an Italian poetess, born in Lucca, Aug. 12, 1763, died April 5, 1837. She was at first a ballet dancer, but soon left the stage and acquired celebrity as an improvisatrice. In 1789 she married Signor Pietro Landucci, a gentleman of Lucca. Great honors were showered upon her in Rome and other cities by the people as well as by poets and academies; and she was equally admired for accomplishments and virtues. Her works include *Rime diverse* (1788); *La Morte di Adone*, a poem in four cantos; and *Il Polidoro*. She was versed in several languages, and translated from the Latin and Greek with ease.

BANDICOOT (*perameles*), a marsupial animal of small size, inhabiting the stony regions of the interior of S. E. Australia. Its appearance is somewhat rat-like, and in its long snout shrew-like. The teeth are sharp and numerous, the incisors being 5 above and 3 below, the canines 1, the premolars 3, and the molars 4, on each side in each jaw. The head is elongated, the back arched, and the mode of progression, from the union of the 2d and 3d toes of the hind feet, the smallness of the hind thumb and outer fore toe, and separation from the others, consists of a gait between a jump and a run; the marsupial pouch opens backward. The most common species, the banded bandicoot (*P. fasciata*), is about 18 inches long, of a blackish yellow color, banded on the hinder parts; it runs with great speed, lives upon roots, seeds, insects, and grubs, and its flesh is esteemed by the natives. The long-nosed bandicoot has, as its name imports, a longer and sharper snout, and a harsh fur of a brownish and blackish color above and white below; the body is 16 inches long and the tail 5. It prefers vegetable food, and is sometimes

Banded Bandicoot (Perameles fasciata).

destructive in the gardens of the colonists, its long and powerful claws enabling it to dig up roots with great facility. The bandicoots make a nest of dried grass and leaves, carefully concealed at the foot of a dense bush.—The *chœropus*, an allied animal of New South Wales, has two toes of equal length on the fore feet, with sharp hoof-like claws resembling those of a pig; the tail is long and rat-like. It is a slender, graceful animal, with very large ears; it is of the size of a small rabbit, and its fur is very soft; its speed is considerable, and it eats both vegetable substances and insects.

BANDIERA, Attilio and **Emilio,** Italian patriots, born respectively in 1817 and 1819, executed at Cosenza, July 25, 1844. They were lieutenants in the Austrian navy, and were the sons of an Austrian vice admiral of a noble Venetian family. Joining the conspiracy for Italian freedom, they took refuge in Corfu in March, 1844, whence with 20 others they effected a landing in Calabria June 16; but being betrayed by one of their number, they fell into the hands of the Neapolitan forces near San Giovanni in Fiore. The two brothers were summarily executed. Their patriotism and heroic spirit created a strong sympathy in their favor in England, where Sir James Graham,

then postmaster general, was severely censured for his supposed share in their fate by opening and disclosing their correspondence with Mazzini. In France, Deschamps and Louise Collet wrote poetry in their honor, and in Italy, Mazzini's work on their martyrdom had a wide circulation, as well as Ricciardi's *Storia dei fratelli B. e consorti* (Florence, 1863).

BANDINELLI, Baccio, an Italian sculptor, born in Florence in 1487, died there in 1559. He was the son of an eminent goldsmith, studied sculpture and painting, and eventually devoted himself exclusively to the former art. Among his best works are a statue of Orpheus, copied from the Apollo Belvedere; a group of Adam and Eve; a copy of the famous group of the Laocoön, in regard of which he boasted of having surpassed the original, which gave rise to Michel Angelo's remark, *Chi va dietro ad alcuno, non puo mai passare inanzi*, "He who follows another, can never pass before him;" the "Descent from the Cross," the "Martyrdom of St. Lawrence," the "Massacre of the Innocents," and the colossal Hercules and Cacus, besides many fine bass-reliefs. His works display a great knowledge of anatomy and much fertility of imagination, but are deficient in grace and elasticity. He was of an envious nature, and was charged with having destroyed one of Michel Angelo's celebrated cartoons. He was patronized by the popes and by Charles V., and left a large fortune.

BANDON. I. A river in the county Cork, Ireland, rises in the Carberry mountains, near Dunmanway, and after an E., N. E., and S. E. course of 40 m. enters the Atlantic, forming Kinsale harbor. It is navigable for vessels of 200 tons to Innishannon, 10 m. inland. **II.** Or **Bandonbridge,** a town of Ireland, county Cork, situated on both sides of the Bandon, 15 m. S. W. of Cork; pop. in 1871, 6,074. It is well built of stone, has several schools, and was once a prosperous manufacturing town.

BANDTKE, or **Bandtkie. I. Jerzy Samuel,** a Polish historian, born in Lublin, Nov. 24, 1768, died in Cracow, June 11, 1835. He was educated in Germany, was a private tutor in St. Petersburg, teacher and rector at Breslau, and librarian and professor in the university of Cracow. He wrote a Polish-German dictionary and grammar, a history of printing in Cracow and in Poland, and other works, the principal of which is his *Dzieje narodu polskiego* ("History of the Polish Nation," 3d ed., 2 vols., Breslau, 1835). **II. Jan Wincenty,** brother of the preceding, born in Lublin in 1783, died in Warsaw in 1851. He was for over 20 years professor of jurisprudence at the university of Warsaw, and published editions of the *Jus Culmense* (Warsaw, 1814), and the *Jus Polonicum* (Breslau, 1831), and a history of Polish law (*Historya prawa polskiego*, Warsaw, 1850).

BANER, Johan, a Swedish general, born near Stockholm, June 23, 1595, died in Halberstadt, May 10, 1641. His father, one of the councillors of Charles IX., gave that king some offence, and was executed at Linköping in 1600. Under Gustavus Adolphus the son took an active part in the conflicts with Russia and Poland, and in the thirty years' war, distinguished himself at Leipsic (1631), where he defeated the right wing of the imperialists under Pappenheim, contributed toward the conquest of Augsburg and Munich, became commander of an important section of the Swedish army, and succeeded in conjunction with Horn in expelling Aldringer from Bavaria. After the death of Gustavus Adolphus he was invested by Oxenstierna with the supreme command of the army. He won a brilliant victory at Wittstock, Sept. 24, 1636, and a still more decisive triumph at Chemnitz in 1639, after which he overran and devastated the whole of Germany, his harsh and overbearing nature intensifying the calamities of the war. His attempt in 1641 to seize the emperor and diet at Ratisbon was frustrated by the difficulty of crossing the Danube. He was overtaken by illness on his return from the expedition, and his death was attributed by some to poison and by others to his licentious and intemperate habits. He had few superiors in reckless daring and gallantry in the field. The king of France called him his cousin, and the emperor endeavored in vain to secure his services by offering him a princely title with Wallenstein's estates as a fief.

BANFF, or **Bamff,** a parliamentary borough, seaport, and the chief town of Banffshire, Scotland, on the left bank of the Deveron (crossed by a fine stone bridge of seven arches), near the entrance of that river into the Moray frith, 117 m. N. of Edinburgh, and 38 m. N. W. of Aberdeen; pop. in 1871, 7,439. It is a fine town, and has been a royal burgh since the end of the 14th century; thread, linen, hosiery, soap, and leather are manufactured. Herring, cod, and salmon fisheries are active, the salmon being sent to London, packed in ice. Corn and cattle are likewise exported. There are about 100 registered vessels.

BANFFSHIRE, or **Banff,** a county in the N. of Scotland, bordering on Moray frith; area, 686 sq. m.; pop. in 1871, 62,010. The surface, more than half of which is uncultivated, is mountainous except near the coast; Ben Mac Dhui (4,362 ft. high) and Cairngorm (4,060 ft.) lie partly within the county. The rivers Avon and Spey form portions of the western boundary, and the Deveron part of the eastern. The lowlands are fertile; cattle-breeding is the principal industry. Many of the inhabitants are engaged in fishing, weaving, bleaching, flax-dressing, tanning, and distilling. Cairns or tumuli are found in the county.

BANG, or **Banj,** a narcotic made of the leaf of a kind of hemp (*cannabis Indica*), used by the orientals as a means of intoxication. It is generally chewed. It is also sometimes given with tobacco, or in coffee or other drinks, and is used to drug persons with.

BANGALORE, a fortified city of southern India, in the state of Mysore, 175 m. W. of Ma-

dras; pop. in 1867 estimated 140,000, mostly Hindoos. It was founded by Hyder Ali, under whom it rose rapidly. Lord Cornwallis took it by assault in 1791, and after the English withdrew Tippoo Saib partially dismantled the fortress and drove away the wealthy merchants by his heavy exactions. On the death of Tippoo the territory, though ruled by a native sovereign, came under British protection, and revived rapidly. The town has considerable trade with all parts of S. India in salt, sugar, spices, metals, dyestuffs, silk, cotton, and wool. Silk and cotton tissues are woven for home consumption. The town is on an elevated site, and is a place of resort for invalids.

BANGKOK, the capital of the kingdom of Siam, situated on the river Menam, about 20 m. from its mouth, in lat. 13° 58′ N., lon. 100° 34′ E.; pop. about 500,000, more than one third of whom are Chinese, 120,000 Siamese, and the rest Malays, Burmans, Arabs, and Hindoos. The Menam is here about 1,300 ft. wide, and sufficiently deep for vessels of large size. When the capital was first established at Bangkok the houses were built on the banks of the river; but so frequent were the invasions of the cholera that one of the kings commanded the people to build on the river itself for the purposes of better ventilation and drainage. The privilege of building on the banks now is reserved to the members of the royal family, the nobility, and persons of political influence. A double and sometimes a triple row of floating houses extends for miles on the river. These are wooden structures built on rafts of bamboo linked together with chains, which are made fast to piles planted in the bed of the stream. The stores are situated together with the houses or form parts of them, and every house has a canoe attached to it. Some of the prisons are grated and hung like bird cages over the water, and in those on land the prisoners are chained together in gangs. In Bangkok there are 20,000 priests supported by the voluntary contributions of the public. There are also American and Roman Catholic missions here. On the land the pagodas and the *phra-cha-dees* or minarets that crown some of the temples are elaborately ornamented with mosaics of fine porcelain inlaid with ivory, gold, and silver, while the doors and windows are overlaid with sculptures of grotesque figures from the Buddhist and Brahminical mythologies. Near the grand palace are three high columns of elegant design inlaid all over with variegated stones, and very richly gilt. These monuments mark the graves of several kings of Siam. The royal palace is a citadel surrounded by triple walls and fortified with bastions. Each of the separate buildings is cruciform, and the new palace forms with the old one the arms of a cross. On one side of the palace are the temples and monasteries dedicated to the sleeping idol, and on the other the palace and harem of the second king. The sleeping idol is a reclining figure 150 ft. long and 40 ft. high, entirely overlaid with plate gold, and the soles of its feet covered with bass-reliefs inlaid with mother-of-pearl and chased with gold, each separate design representing one of the many transmigrations of Buddha. Near this temple is the palace of the white elephant, and further on the temple of the emerald idol. The latter is a remarkable and beautiful structure, with Gothic doors and windows richly ornamented with gold, and the roof supported by lofty octagonal columns, the ceiling covered with mythological symbols and figures; the altar is a pyramid 100 ft. high, terminating in a fine spire of gold. The emerald idol is about 12 inches high and 8 in width. The gold of which its hair and collar are composed is mixed with crystals, topazes, sapphires, diamonds, and other precious stones. Three miles below the capital are the royal dockyards, under the supervision of English shipwrights. The heat in the summer months is intense. Trade is mostly carried on by water. The principal articles of commerce are lac, ivory, rice, cotton, opium, silk and silk stuffs, sago, sugar, guava, birds' nests, mungo, dauries, coffee, cocoanuts, black pepper, hides, horses, tobacco, gums, teak, tin, sandal, rosewood, and eagle-wood. There are numerous factories of tin, iron, and leather. The foreign trade is nearly monopolized by the government. The value of the exports in 1869 was $5,905,880, of which $2,278,860 was carried in Siamese and the rest in foreign vessels. The invoice value of cargoes imported was $3,759,350, of which $2,722,715 was carried in Siamese vessels. The country surrounding Bangkok contains rich iron mines and extensive forests of teak.

BANGOR, a city, seat of justice of Penobscot county, Maine, and a port of entry, on the W. bank of the Penobscot river, at its junction with the Kenduskeag, about 55 m. from the ocean and 60 m. N. E. of Augusta; pop. in 1860, 16,407; in 1870, 18,289. It has a safe and capacious harbor, accessible at the highest tides, which rise 17 feet, to the largest vessels. The city is situated on both banks of the Kenduskeag, connected by a fine stone bridge, toward which the principal streets converge. There is also a bridge 1,320 ft. long across the Penobscot, connecting Bangor with Brewer. Many of the streets are broad and well shaded with elm trees. The chief public building is the custom house, a handsome granite structure, which cost $100,000. Bangor is, next to Chicago, the greatest depot of lumber on the continent, 200,000,000 feet being frequently received in a year. The head waters of the Penobscot traverse immense forests of pine, spruce, and hemlock. The cutting and hauling of this timber to the river in the winter, driving, booming, sawing, and rafting it, and loading it on vessels in the harbor, give employment to a large number of men. About 2,000 vessels are annually engaged in this trade, during the eight or nine months in which the river is free from ice. The city is also the centre of a

fine agricultural district. The Bangor theological seminary (Trinitarian Congregational), originally established in 1816 at Hampden, 6 m. below the city, occupies an elevated position, overlooking the city and the Penobscot river. In 1870 it had 4 professors, 24 students, a library of 13,000 volumes, and an endowment of $120,000. There are 17 churches (7 Congregational, 2 Baptist, 2 Methodist, 1 Free-will Baptist, 1 Universalist, 1 Unitarian, 1 Episcopal, 1 Catholic, and 1 Second Advent), 53 public schools, 6 national banks, 3 state banks, 2 savings banks, and 1 daily and 1 weekly newspaper. The Bangor library association, founded in 1843, has 11,000 volumes. The value of real and personal estate in 1860 was $6,015,601, and in 1870, $9,851,561. The city is connected with Portland, Boston, and other points on the coast by two lines of steamers. By a branch of the Maine Central railroad it has railroad connection with Waterville, Belfast, Augusta, Bath, Portland, &c. The European and North American railway is to form the only all-rail route between Bangor (where it connects with the Maine Central railroad) and St. John, New Brunswick, a distance of 200 m. The imports for the year ending June 30, 1871, amounted to $51,094, and the exports to $163,385. The clearances for foreign ports were 29 American vessels, of 5,777 tons, and 56 foreign, of 6,232 tons; entrances, 4 American vessels, of 1,039 tons, and 47 foreign, of 4,414 tons. In the coast trade 284 vessels, with an aggregate tonnage of 190,237 and 6,216 men, entered, and 22 vessels of 3,618 tons cleared. The number of vessels registered, enrolled, and licensed was 192, with an aggregate tonnage of 26,659; and there were 9 vessels, of 526 tons, engaged in the cod and mackerel fishery.—Bangor was incorporated as a town in 1791, and as a city in 1834. It was named by the Rev. Seth Noble from the tune "Bangor."

BANGOR. **I.** A city and parliamentary borough of Carnarvonshire, Wales, situated at the head of Beaumaris bay on the Menai strait, 2½ m. from the Britannia bridge, and 9 m. N. E. of Carnarvon; pop. of the city in 1871, 6,738. It exports slates, and is much resorted to for sea bathing. A cathedral of the 15th and 16th centuries, occupying the site of a church supposed to have been built in the 6th century, a free school founded in the time of Elizabeth, and an episcopal palace, are its most interesting buildings. **II.** A seaport town of Ireland, county Down, on Belfast Lough, 12 m. E. N. E. of Belfast; pop. in 1871, 2,525. It has fisheries, and is a place of resort for bathing. It was the seat of a famous monastery supposed to have been destroyed by the Danes in the 9th century.

BANGS, Nathan, D. D., an American clergyman, born at Stratford, Conn., May 2, 1778, died May 3, 1862. He entered the itinerant ministry of the Methodist Episcopal church in 1801. After seven years of labor in the Canadian provinces, and a term of ministerial service in the Albany district, he was appointed to the city of New York in 1810. He was elected in 1820 agent of the Methodist book concern, and editor of the books published by this house. After an official term of eight years, he was chosen editor of the "Christian Advocate and Journal." In 1829 he was elected bishop of the Methodist Episcopal church in Canada, but declined the appointment. From 1832 to 1836 he was editor of the "Methodist Magazine" and "Quarterly Review," having also been continued in the editorial supervision of the books published by the book concern since 1820. From 1836 to 1841 he was secretary of the Methodist missionary society, and then became president of the Wesleyan university, at Middletown, Conn. Resigning this office, he returned to the regular pastoral work, and remained a member of the New York conference to the time of his death. Dr. Bangs was the author of numerous controversial works, among which are "The Errors of Hopkinsianism," "Predestination Examined," "Reformer Reformed," "Life of Arminius," &c. He also wrote the "Life of the Rev. Freeborn Garrettson," "History of Missions," "Original Church of Christ," "Letters on Sanctification," and a "History of the Methodist Episcopal Church" (4 vols. 12mo), a standard work.

BANIALUKA, a fortified town of Turkey in Europe, in the province of Bosnia, on the left bank of the Verbas, 90 m. N. W. of Bosna-Serai; pop. about 15,000. It contains 40 mosques, several colleges, public baths, a cathedral, and a powder mill.

BANIAN, or **Banyan** (*ficus religiosa* or *Indica*), a fig tree of the East Indies, remarkable for its manner of growth and longevity. The fruit is red and not much larger than a pea, and the seeds are minute, but covered with a hard testa which protects them from the digestive organs of the birds who seek the fig as food. The birds plant the seeds in crevices of stones or buildings, or on trees, and with the necessary moisture they germinate in these places, sending their roots into and widening the chinks, or down the moist bark of the tree on which the seed has been dropped, and the plant grows rapidly into a broad, spreading, although not very lofty tree, whose horizontal branches send down roots as slender fibres until they reach the earth, when the growth is reversed and the depending rootlet becomes an ascending trunk equalling or even surpassing the parent stem. A famous banian stood on the banks of the Nerbudda which could shelter 7,000 men, and others cover more than 13 acres. They are frequently found near temples and on the mounds where the Hindoo widows have performed suttee, as the birds are attracted to these places. The figs, although small, are abundant, insipid in taste, and of mild medicinal properties. The leaves are of a bright green and form a dense shade, effectually preventing the growth of underbrush. They are about five inches in length and four

Banian Tree.

in width, and are downy on both sides when young, becoming smooth and brilliant as they grow. The Brahmins use the leaves as plates and dishes. The bark is supposed by the Hindoos to be a powerful tonic; and they use the white gum of the tree as a cure for the toothache, or apply it as a healing plaster to the feet when chafed or bruised. Bird-lime is also made from this gum. The wood of the tree is porous and almost useless.

BANIM. I. John, an Irish novelist, born in Kilkenny, April 3, 1798, died near Kilkenny, Aug. 1, 1842. In his youth he went to Dublin and afterward to London to seek literary employment, was befriended by Shiel, and in his 24th year won a brilliant success by his tragedy of "Damon and Pythias," played by Macready and Kemble at Covent Garden. Soon afterward he began with his brother Michael a series of novels illustrative of Irish life, which appeared in 1825 under the title of "Tales by the O'Hara Family," and were followed in 1826 by a second series. "The Bit o' Writin'," "Boyne Water," "The Denounced," "The Nowlans," "The Smuggler," and other stories appeared at short intervals, and nearly all became very popular. Banim died in poverty, and in his latter years was supported chiefly by a pension from the government. **II. Michael,** brother of the preceding, born in August, 1796. He assisted his brother in the "Tales by the O'Hara Family," and is the author of "The Croppy," "Father Connell," "Crohoore of Bill-hook," "The Ghost-hunter," "The Mayor of Wind Gap," &c.

BANISTER, or **Halifax Court House,** a post village of Halifax co., Virginia, on the Banister river, 10 m. above its confluence with the Dan, and 120 m. by rail S.W. of Richmond; pop. in 1870, 3,731. The Richmond and Danville railroad passes through it, and the river is navigable for bateaux from its mouth to Meadville, 10 m. above Banister. Six miles from the village there is a plumbago mine.

BANJERMASSIN, or **Banjarmassin. I.** A large state of S. E. Borneo, governed by a sultan subordinate to the Dutch government; pop. vaguely estimated at about 300,000, nearly all Mohammedans. It borders on the strait of Macassar, and is bounded W. by the Banjer river. A range of mountains, some of them over 3,000 ft. high, runs through the district. Iron, diamonds, and excellent coal are found, and the natives are noted for their skill in making all kinds of arms. Pepper is the most important product of the soil. The trade is controlled by the Chinese. The Dutch settled here in 1747, and in 1787 made a treaty with the sultan by which their supremacy was recognized in consideration of their aid in repelling an invasion from Celebes. The British East India company seized Banjermassin in 1811, but restored it in 1817. **II.** The chief town of the preceding state, and capital of the Dutch residency of the S. and E. coasts, situated on the left bank of the river Banjer, about 15 m. from its mouth in the Java sea; lat. 3° 23′ S., lon. 114° 37′ E.; pop. about 15,000. The houses are raised on piles, the site being frequently inundated, and most of the traffic is carried on in boats. There is a fort, which encloses the Dutch resident's house, barracks, &c. Pepper, benzoin, bezoar, rattans, iron, and birds' nests are exported. The imports include rice, salt, sugar, opium, gunpowder, silk, &c.

BANJO (corrupted from *bandore*, a species of guitar), a musical stringed instrument much esteemed by the negroes of the southern

United States. Its capacity is limited to the performance of simple tunes, and it is purely an instrument of accompaniment. Its head and neck are shaped like the guitar, while the body is a circular frame like the head of a drum, over which parchment is stretched in place of a sounding board. Five strings, of which the fifth is shorter than the others, pass over this parchment, and are played with the fingers.

BANK, in trade and business, a place of deposit for money. In nearly all languages the words for bank and banker are derived from those meaning table, bench, or counter: τραπεζίτης among the Greeks, *mensarius* among the Romans, and *banchiero* among the Italians of the middle ages. The banker was originally a changer, and he stood in the market place and furnished such different kinds of money as were demanded. By degrees he took funds on deposit, made advances upon securities, merchandise, pledges, titles to property, family papers, &c., and became finally what we now know as a banker. The lending of money with the taking of interest for its use is a custom which dates from the earliest antiquity of which there are records. Constant reference is made to it in both the Old and the New Testament. In ancient Greece the business of receiving money on deposit and lending it out was an important one, and the money changer stood high in credit and in the confidence of both the government and the people of Athens. The state bank of New Ilium, of the precise nature of which we are not informed, in the second century before Christ, borrowed money for the state, and paid for its use 10 per cent.—Banks are designed to afford safe places of deposit for the money of individuals, corporations, or governments; for facilitating the exchange of money from the hands of parties who have payments to make to those of such persons as are to receive them, thus becoming clearing houses for the communities in the midst of which they are situated; and for extending aid to business by granting loans or discounts on notes, bonds, stocks, or other securities. These institutions are of three kinds, and may be classed as follows: Banks of deposit receive on deposit the money of individuals, corporations, or governments, and hold it subject to the draft of its owner or owners, or under such other agreement as may be entered into. Banks of discount furnish loans upon drafts, promissory notes, bonds, or other securities. Banks of circulation pay out their own notes, which may or may not, according to circumstances, be payable in coin on demand. Banks which exercise the last of these functions generally unite the first and second.—The bank of Venice, the first establishment of the kind in Europe, was founded in 1171, and owed its existence to wars and the necessity for the government obtaining the means for conducting them. Having exhausted every other resource, the state was obliged to resort to a forced loan from its most opulent citizens. Then was organized the chamber of loans, which by degrees assumed the form under which, as the bank of Venice, "it was for many ages the admiration of Europe, the chief instrument of Venetian finance, and the chief facility of a commerce not surpassed by that of any European nation." Funds once deposited in the bank could not be withdrawn, but were transferable at the pleasure of their owners upon its books. So thoroughly did the bank credits become the means through and by which the financial operations of the people were conducted, that during its entire existence, with but slight exceptions, these credits were at a premium over coins, which latter were clipped and worn, as well as of various countries and uncertain values. That the people were well satisfied with this institution and its workings may be inferred from the fact that "no book, speech, nor pamphlet have we found," says an eminent economical writer, "in which any merchant or dweller in Venice ever put forth any condemnation of its theory or its practice." The bank of Venice continued in existence without interruption until the overthrow of the republic in 1797, by the revolutionary army of France.—The bank of Genoa was projected in the year 1345, but did not go into full operation till 1407. It was for centuries one of the principal institutions of its class in Europe. Within a space of less than 60 years—first in 1746, and again in 1800—it was twice pillaged by a foreign foe, in the latter instance by the French army under Masséna. From the effects of this disaster it has never recovered, and it has ceased to perform the functions of a bank.—The bank of Barcelona was established in the year 1401, that city having been during the middle ages one of the most enterprising and flourishing of the trading cities of Europe. Here it was that the system of negotiation of bills of exchange was first instituted.—The bank of Amsterdam was founded in the year 1609, Holland being then possessed of an important foreign trade. It was a bank of deposit only, and the money in its possession was transferred on the books of the institution at the pleasure of its owner or owners. The primary object of the establishment of the bank was to give a standard or certain value to bills which might be drawn upon Amsterdam—rendered necessary by the depreciation of the coins, owing to their having been worn or clipped. Here these coins were received on deposit, and had their value established by weight and fineness. It was not the design on founding the institution that the funds should at any time be lent out, but should remain in its vaults. However, the directors having lent to the governments of Holland and Friesland and to the East India company 10,500,000 florins, the fact became known on the invasion of the French army in 1794, and produced the ruin of the institution. The amount of treasure in the vaults of the bank in

1778 was estimated by Mr. Hope at 33,000,000 florins.—The bank of Hamburg was established in the year 1619. This institution is a bank of deposit and circulation, which circulation is based upon fine silver in bars. The stock of the bank arises out of the deposits, which are confined solely to silver. The bank of Hamburg differs essentially from any other banking institution in the world. The difference at which it receives and pays out the silver deposits, about one half of 1 per cent., constitutes the charge of the bank for custody of the funds intrusted to it. Although in some respects it has undergone changes in its management since it was instituted, still the plan is essentially the same as it was in 1710. It has been felt, as well by the mercantile community of Hamburg as by those directly interested in the bank, that changes are necessary to conform to the present state of business. It is deemed desirable that the bank should be enabled to make better use of its surplus capital, which owing to restrictions is almost valueless. Its deposits, Oct. 10, 1872, were 30,766,666 thalers. The bank of Rotterdam was established in 1635; the bank of Stockholm in 1688.—*British Banks.* The bank of England was established in 1694, William and Mary then being on the throne. To the war with France, and the extreme difficulty experienced by the government in raising funds for conducting that war, is the institution of this monopoly due. The idea originated with William Paterson, a merchant of London, who readily saw that the government, which had been paying interest at the rate of from 20 to 40 per cent. per annum, would without much hesitation grant exclusive and almost unlimited privileges to such parties as would in turn furnish it with a fixed and permanent loan, at a reasonable rate of interest. The plan, being brought to the attention of the king, was submitted to the privy council, when the details were completed, and it was laid before parliament. There, however, it met with the violent opposition of a formidable party. Nevertheless, the bill was carried by the government, and on April 25, 1694, became a law. It was provided that the capital, £1,200,000, should be permanently lent to the government at 8 per cent. per annum, and that in addition to the interest an allowance of £4,000 per annum should be made by the government for the management of the debt. So popular was the scheme, and so great was the desire of the public to become proprietors of the bank, that within ten days after the books were opened the entire capital was subscribed. The corporate title under which this institution commenced operations, and has continued to the present day, is "The Governor and Company of the Bank of England." The bank was opened for business on Jan. 1, 1695, the stockholders having previously elected a governor, a deputy governor, and a board of 24 directors. Those several parties were required by law to hold stock as follows: governor £4,000, deputy governor £3,000, and director £2,000. The charter was granted for eleven years, and the officers were required to be elected annually between March 25 and April 25, after the year 1696. The bank immediately issued notes, none of which were, however, of a smaller denomination than £20 sterling, and commenced discounting bills of exchange at rates varying from 3 to 6 per cent., distinction being made in favor of persons who used the bank as a place of deposit. Within two years the institution experienced considerable trouble, under the influence of which its notes fell as low as 20 per cent. below par. Although notes to the amount of £480,000 were redeemed, it was found necessary in 1697 to increase the capital £1,000,000 sterling. This increase had the effect within a few months of causing the stock not only to recover a discount of from 40 to 50 per cent., but to sell at a premium of 12 per cent. Since first this institution was founded, its capital and the loan to the government have been nearly identical in amount. In 1833, however, the debt to the bank was reduced about £3,500,000. The following table gives the capital of the bank at various periods, and also the dates of the several renewals of the charter, with the amount of government debt at each period:

Dates.	Capital.	Dates of renewal.	Government debt.
1694	£1,200,000	1694	£1,200,000
1697	2,201,171	1697	1,200,000
1708	4,402,343	1708	3,375,027
1709	5,058,547	1713	3,375,027
1710	5,559,996	1742	10,700,000
1722	8,959,996	1764	11,686,800
1742	9,800,000	1781	11,686,800
1746	10,780,000	1800	11,686,800
1782	11,642,400	1833	11,015,100
1816	14,553,000	1844	11,015,100

The management of the entire public debt of Great Britain is placed in the hands of the bank of England, for which service it has received compensation, which has from time to time varied in amount according to circumstances. During the year 1845 this compensation was £93,111 19*s.* 10*d.* In addition to the permanent debt of the government to the bank, the latter contracted with the former on March 20, 1823, to pay at stated intervals between 1823 and 1828 certain pensions and annuities arising out of the then recent wars, amounting to £13,089,419. This is termed the "dead weight." In consideration of this the bank was to receive from the government an annuity of £585,740 for 44 years. On Feb. 26, 1797, an order was issued by the privy council to the bank restraining it from the further payment of specie. On the following day the officers of the bank issued a notice, in which they stated that, in consequence of the foregoing order they "think it is their duty to inform the proprietors of the bank stock as well as the public at large, that the general concerns of the bank are in the most affluent and flourishing situation, and such as to preclude every doubt as to

the security of its notes." At the same time they announced their determination to continue their usual discounts. The fact was, the order in council simply prohibited the bank from doing that which it was entirely out of the question for it to do. On Feb. 27, the same day on which the bank suspended specie payments, parliament approved the order in council. Notes of the denomination of £1 sterling were immediately prepared and issued, and all fractional parts of a pound were refused payment by the bank. This suspension, while it was absolutely necessary to prevent the ruin of the bank, was of equal importance to every business interest throughout the kingdom. The government, while it interposed for these important ends, was equally interested in the welfare of the institution with which it was so intimately connected in all its financial concerns. It was then struggling through its tremendous efforts against the power of France and Napoleon, and the bank was to it what the heart is to the animal organism, its circulating notes what the blood is to that organism—the very source of vitality and power. Although every assurance was given that this measure was intended to be merely temporary, it was continued from time to time until May 1, 1823, when the resumption of specie payments took place, for which preparation had gradually been made within the previous four years. This was not, however, accomplished without widespread disaster, the details of which are painful to read even at this distant day. This was the case, too, with gold at the following rates of premium in the under-mentioned years: 1816, 2½ per cent.; 1816, October to December, under 1 per cent.; 1817, 2½; 1818, 5; 1819, 6½; 1820 and 1821, par. On the renewal of the charter in 1844, Sir Robert Peel, then prime minister, having become satisfied of the dangerous influence exerted in its ever varying and never stable system, first of expansion and then of contraction, in its loans, thought to provide a remedy. The principal feature of this measure was to limit the circulation so that it would be regulated by the amount of coin and bullion in the vaults of the institution. Accordingly, he brought in a bill which became a law on July 19, 1844, entitled "An act to regulate the issue of bank notes, and for giving to the governor and company of the bank of England certain privileges for a limited period." The following abstract of parts of that law will give an idea of such provisions as refer to the bank of England: § 1. Provides for "the issue department of the bank of England," which shall provide the notes payable on demand, and shall, from Aug. 31, 1844, be kept wholly separate and distinct. § 2. That on Aug. 31, 1844, the bank shall transfer to the issue department securities to the value of 14 millions, the debt due by the public to be deemed part; that the banking department shall transfer to the issue department all the gold coin and gold and silver bullion not required; that the issue department shall deliver to the banking department such an amount of notes as with those in circulation shall equal the securities, coin, and bullion transferred to the issue department; that the bank may not increase, but may diminish the amount, and again increase it to any sum not exceeding 14 millions. § 3. That the bank shall not retain in its issue department at one time silver to any amount greater than one fourth the gold held at the same time. § 4. That notes may be demanded for gold bullion at the rate of £3 17*s.* 9*d.* per oz. of standard gold. § 6. Provides for a weekly statement of the affairs of the bank. § 7. That the bank shall be exempt from stamp duty on its notes. § 8. That the bank allow £180,000 per annum out of the amounts payable by government for the exclusive privileges of banking. § 9. That the public shall receive such profit as may be obtained by an increase of circulation beyond the amount provided by section 2. § 10. That no other banks of issue be allowed but such as were in existence May 6, 1844. § 11. That no banker in England or Wales shall issue any bill of exchange or promissory note payable on demand, excepting such bankers as were in existence May 6, 1844. That no company now consisting of six or less than six partners shall, if they exceed that number, be allowed to issue notes. The important provisions of this act were that the bank might issue £11,000,000, for which the public debt due the bank should be security, and £3,000,000 on exchequer bills and such other government securities as it might hold, but that for every pound sterling issued beyond the £14,000,000 the bank should hold an equal amount in gold and silver. An examination of the operations of the bank will, we think, demonstrate the fact that Sir Robert Peel entirely misapprehended the causes at work in producing the fluctuations complained of, and that he applied the restrictions to that particular branch which varied but little in a series of years. The real cause of trouble was to be found in the loans, which have been irregular in the extreme and at times productive of great injury. This injury has not alone been confined to Great Britain, but has extended in a greater or less degree to every country with which intimate business relations existed. That this act has had no effect in mitigating this crying evil, will be clearly seen in the fact that these fluctuations have never been more violent than since its passage. The British public had long shown entire confidence in the circulating medium, and no legislation to effect this object was necessary. Within the 28 years which have elapsed since its passage, the operation of this law has three times been suspended, as doubtless it will be again whenever it is rendered necessary so to do. The first of these was on Oct. 25, 1847, the second on Nov. 12, 1857, and the third on May 11, 1866, on which latter day the bank raised the rate of discount to 10 per cent, it having been 6 per cent. nine days before. In its efforts to save

itself and comply with the absurd provisions of the bank act, it spread ruin and desolation around it, and years have been necessary to enable the country to recover from the effects of the panic thus created. While the notes of the bank are legal tender elsewhere, they are not such in payments by the bank itself. Its condition on Oct. 16, 1872, was as follows:

ISSUE DEPARTMENT.

Notes issued	£34,328,780	Government debt	£11,015,100
		Other securities	3,984,900
		Gold coin and bullion	19,328,780
	£34,328,780		£34,328,780

BANKING DEPARTMENT.

Proprietors' capital	£14,553,000	Government securities	£13,256,546
Rest	3,145,478	Other securities	21,330,271
Public deposits, including exchequer, savings banks, commissioners of national debt, and dividend accounts	5,510,196	Notes	7,889,125
		Gold and silver coin	661,856
Other deposits	19,465,772		
Seven-day and other bills	463,352		
	£43,137,798		£43,137,798

—Prior to the establishment of the bank of England, banking in London was conducted first by the Jews, who were succeeded by the Lombards, who were in turn supplanted by the goldsmiths. The latter lent money at rates much below those charged by their predecessors, and they issued promissory notes payable on demand, or at a certain period after date. These bankers deposited their funds at the royal mint in the tower of London. This practice was discontinued when Charles I., being in want of money, seized the amount thus deposited, £200,000, by which means the bankers were utterly ruined. During the civil war the business of the goldsmiths largely increased, and during the commonwealth, as well as subsequently, various plans were devised by different individuals for the establishment of public banks. No action was, however, taken to mature and carry out these plans until the establishment of the bank of England. After the seizure of the funds by Charles I., it was the practice of the goldsmiths to deposit their surplus means in the exchequer, which funds were drawn once a week, to meet such demands as might be made upon their owners. Charles II. in 1672, being in want of money, closed the exchequer, and seized the funds belonging to the goldsmiths, amounting to £1,328,562, on which there accrued 25 years' interest, making thereby a sum total of £3,321,313. No consideration was given for any part of this large sum, except £664,263, for which government loan was issued, forming the basis of the present national debt of Great Britain. As may readily be imagined, the goldsmiths were ruined irretrievably by this infamous proceeding.—The earliest country bank established in England, of which there exists any record, was at Newcastle-on-Tyne, in 1755. This was a bank of issue. From that period the number of these institutions increased. On the renewal of the charter of the bank of England in 1708, the bank obtained the privilege of banking to the exclusion of all copartnerships of more than six persons. In consequence of this law, the various joint-stock banks in existence at the time were compelled to wind up their affairs. In 1825, however, an act was passed allowing copartnerships of more than six persons to carry on business in England as bankers 65 miles from London, with the provision that each stockholder should be liable for the entire debts of the bank. Notwithstanding the provisions of this law, which would seem to prevent any joint-stock bank being established within 65 miles of London, in 1834 the London and Westminster bank was founded, and has been in operation ever since, although not without having troubles to encounter. Litigation with the bank of England, and other difficulties, at first beset it, but through all of these it passed, and has met with high success. Since the establishment of this institution, various others of the kind have been founded in and about London. By the issue act of 1844, no bank in any part of the United Kingdom which did not on May 6, 1844, issue notes, was allowed thereafter to exercise that privilege. By an act passed during the same year, with reference to joint-stock banks in England, so many restrictive clauses were introduced as practically to prevent any new institutions of the kind from being established. Within a recent period, however, the passage of a new act more liberal in its provisions has recognized limited liability, and under it 30 institutions are in operation throughout the United Kingdom at the present time (December, 1872). Perhaps nowhere in the world does the history of banking show greater instability than in England, where during this century joint-stock banks have failed by scores. Their profits have in many instances been very large, but their risks being correspondingly great, their failures have been most disastrous.—Greater freedom has always existed in Scotch banking than in that of England, and consequently there has been greater security—those institutions, unlike the great monopoly, trading upon their own capital. The earliest bank established was the bank of Scotland, founded in 1695; followed in 1727 by the royal bank of Scotland, in 1746 by the British Linen company, in 1810 by the Commercial bank, and in 1825 by the National bank. In addition to these, joint-stock banks with limited liability have been allowed freely to be established.

These banks have passed readily through commercial crises which have destroyed large numbers of such institutions in England.—Various attempts to establish a public bank in Ireland were from time to time made, and, meeting with opposition in the Irish parliament, were defeated. It was not till 1782 that a bill was passed incorporating the "Governor and Company of the Bank of Ireland," which institution commenced business in Dublin, June 1, 1783, and is still in successful operation. This was succeeded by the Belfast bank in 1808, the Hibernian bank of Ireland in 1825, the Provincial bank of Ireland in 1834, the National bank, and others, all of which are joint-stock banks.—The notes in circulation in the United Kingdom, other than those of the bank of England, in September, 1872, were as follows: England, £5,057,910; Scotland, £5,313,560; Ireland, £7,242,081; total, £17,613,551.—*The Bank of France.* In 1716 a bank was founded in Paris under this name, which was two years subsequently changed to the Royal bank. Under this organization it remained till 1803, when, having been unsuccessful, it was placed upon its present organization as the bank of France, with a capital of 45,000,000 fr., which was in 1806 increased to 90,000,000 fr. At present the capital is 182,500,000 fr., and the charter of the bank extends to Dec. 31, 1897. It is a bank of deposit, discount, and circulation, issuing its own notes, and having an exclusive monopoly of this privilege for the entire country. It is a public institution, the government appointing a governor and two deputy governors, all of whom must be stockholders in the bank. The affairs of the institution are managed by a council general of 20 members, who are elected by 200 of the principal stockholders. No bills are discounted having more than three months to run before maturity, and as a general thing must be guaranteed by three approved signatures, though in some instances two are accepted. The governor annually makes a report of the condition of the affairs of the bank, with statements in detail of its issues, assets, loans, and other particulars. The annual dividends are limited to 5 per cent.; all profits over that amount being invested in 5 per cent. consolidated stock, to be divided among the stockholders at the expiration of the charter. In 1848 banks existed at Rouen, Lyons, Havre, Lille, Toulouse, Orleans, Marseilles, Nantes, and Bordeaux; but by the provisional government these were united to the bank of France. The bank has now 62 branches in various parts of France. In August, 1870, specie payments were suspended, and have so continued to the present time (December, 1872); but the premium on gold has never been over 1 per cent. In October, 1872, the bank had of notes in circulation 2,524,140,010 fr., held cash in hand 786,534,812 fr., treasury bonds and *rentes immobilisées* 1,450,367,500 fr.—*Belgian Banks.* The oldest of these is the *société générale*, founded Aug. 28, 1822, capital 50,000,000 florins. It was a bank of discount, and managed the finances of the government till after the separation of Belgium from Holland, when it resigned that function to the bank of Belgium. This latter institution, organized originally with a capital of 20,000,000 francs, was in 1838 compelled to suspend payment, a difficulty out of which it was extricated by the government. However, in 1839 it suspended again. In 1841 its capital was increased by 10,000,000 fr., the subscribers to the new stock receiving 5 per cent., while the old stockholders were to have but 4. In addition to this rate of interest, the bank has paid a semi-annual dividend. Up to 1850 it had charge of the affairs of the government, when it resigned them to the National bank of Belgium, founded May 5, 1850. This institution, which is a joint-stock bank, has a capital of 25,000,000 fr. It is a bank of deposit and exchange, and is allowed to issue notes to three times the amount of the coin in its coffers, and issues them of the denominations of 20, 50, 100, 500, and 1,000 fr. In this bank the *société générale* took 10,000,000 of the capital, and the bank of Belgium 15,000,000, both agreeing to cease their issues of notes and abandon their discount business, although retaining their organization and receiving deposits. Oct. 9, 1872, the National bank of Belgium held of specie 123,625,000 fr., had made discounts and advances 284,400,000 fr., and had a circulation of 253,550,000 fr. It pays large dividends to its stockholders.—*Netherlands.* The bank of the Netherlands was first chartered in 1814, with a capital of 5,000,000 florins, which was increased to 10,000,000 in 1819 and 15,000,000 in 1838. Subsequent changes have been made, the last in 1863, when it was rechartered. On Oct. 14, 1872, the condition of the bank was as follows: coin and bullion, 117,768,000 fl.; discounts and advances, 106,056,000 fl.; notes in circulation, 163,332,000 fl.; deposits, 36,456,000 fl.—*Austria.* The National bank of Austria was founded in Vienna in 1816, for the purpose of restoring the finances and credit of the government, which were greatly impaired. It has the exclusive privilege of issuing circulating notes. Its capital is 110,250,000 florins, and its condition, Oct. 9, 1872, was as follows: coin and bullion, 138,760,000 fl.; discounts and advances, 186,480,000 fl.; circulation, 319,190,000 fl. Its charter extends to 1876, and it loans to the state, in consideration of the privileges granted it, 80,000,000 fl. without interest. The rate of discount varies between 4 and 5 per cent. per annum; it issues bills of 5, 10, 100, and 1,000 fl.; and it has 22 branches in different parts of the empire.—*German Empire.* The Royal bank of Prussia was established at Berlin, June 17, 1765, as an exchange and loan bank, with a capital of 400,000 thalers. Dec. 31, 1871, its capital was: bank shares, 20,000,000 thalers; state active capital, 1,906,800; and it had a reserve fund of 6,000,000 thalers, giving an actual working capital of 27,906,800. It held deposits of 20,-

577,088 thalers; notes either in circulation or in the hands of the bank or its branches, 360,723,312; bills of exchange, 114,856,512; Lombard loans, 23,617,365; gold and silver coin and bullion, 277,528,846. Its total transactions, receipts, and disbursements for 1871 amounted to 6,365,839,600 thalers. At the close of 1871, the Prussian branch comprised the chief bank at Berlin and 163 branches in the several provinces of the state, including Alsace and Lorraine. For the year the average rate of discount was 4·16 per cent., Lombard rate 5·16 per cent. Although this institution is a government one, it does not possess monopoly privileges, but other banks are permitted throughout the kingdom. Indeed, much freedom in banking, under certain restraints, has been for years past permitted in northern Germany. The popular or coöperative banks established under the initiative of Schultze-Delitzch have proved a highly important and most beneficent class of institutions in enabling workmen to combine their means for mutual financial assistance in business in a small way. Their study is a subject worthy of the attention of the workmen of this country. They are established without the assistance of capitalists, and make advances only to their members.—The Royal bank of Nuremberg, Bavaria, is an old institution, which does a business of exchange, discount, loan, and deposit. It is connected with the state, and its affairs are managed by finance ministers. It has several branches. No publication of its affairs is made. The Loan and Exchange bank of Bavaria began operations in 1835, and was chartered for 99 years from 1834. It lends on goods, and discounts bills of exchange, Bavarian securities, and specie, and effects fire and life insurance. Its issue is limited to 8,000,000 florins, 2,000,000 being based on specie.—The bank of Leipsic, Saxony, was founded in 1839, with a capital of 1,500,000 thalers, which has since been increased, provision also being made for a large reserve. The Saxon bank in Dresden was founded in 1865, and on Dec. 31, 1871, held of coin and bullion 9,215,000 thalers, treasury and other notes 1,400,000 thalers, bills of exchange 11,678,000 thalers, Lombards 4,282,000 thalers, and had notes in circulation 20,988,000 thalers.—There are four banks at Stuttgart, Würtemberg. There are also banks at Königsberg, Frankfort, Cologne, Darmstadt, Weimar, Brunswick, Bremen, Dessau, and other points in the German empire, issuing circulating notes.—*Switzerland.* Basel and Geneva have long been famous for the character and wealth of their banks, but the earliest Swiss bank of issue, that of St. Gall, only dates from 1836. At the end of 1869 there were 19 such banks in that country—those of St. Gall, Zürich, Vaud, Basel, Geneva (bank of Commerce and bank of Geneva), Thurgau, Glarus, Neufchâtel, Fribourg, Aargau, Valais, Lucerne, Soleure, Bern, Ticino, Grisons, and Schaffhausen. They make dividends of from 4½ to 7½ per cent. Their condition, Dec. 31, 1869, was as follows: circulation, 18,468,122 fr.; deposits, 49,166,405; specie, 19,380,922; capital, 73,357,784; loans (exclusive of those of the bank of St. Gall, capital 5,358,613 fr.), 71,667,706.—*Italy.* The oldest existing bank in Italy is that of the Monte di Paschi of Siena, founded in 1622. The National bank of Italy, created by royal decree Nov. 14, 1849, was the result of a union between the two banks at Genoa and Turin, the former founded in 1844, the latter in 1847. Its charter lasts till Dec. 31, 1889, and its capital, originally 40,000,000 lire, is now 100,000,000. By act of Sept. 3, 1868, the circulation of bank notes was limited to 700,000,000 lire. They are a legal tender by act of May, 1866. The bank has gradually extended its action over Italy, and besides seats in Genoa, Turin, Milan, Naples, Palermo, Florence, and Venice, had in 1870 55 branches in all parts of the kingdom. It is a bank of discount, deposit, and circulation. Its condition in 1870 was as follows: Discounts, 828,666,172 lire; average circulation, 775,879,712. On Oct. 31, 1868, it had specie and bullion 178,000,000 lire. The state is a large debtor to this institution, and its financial operations are mainly conducted by the aid of it. There are also the following: Bank of Naples, bank of Palermo, National bank of Tuscany, Credit bank of Tuscany, Mercantile Establishment of Venetia, Anglo-Italian bank (founded in London in 1864), Farmers' Credit bank of Pisa, National Discount bank of Tuscany, General bank of Genoa, Italian Credit bank of Turin, Discount and Silk bank of Turin, &c. In August, 1871, there were in Italy 39 credit institutions and banks (the National bank and branches counting as 1), and 57 people's banks. Of the former 31 publish reports showing a paid-up capital of 86,141,268 lire; and of the latter 51 give reports showing a paid-up capital of 17,501,855 lire.—*Spain, Portugal, Denmark, Sweden and Norway, Russia, and Greece,* all have their banking systems, more or less intimately connected with the fiscal operations of their respective governments.—BANKING IN THE UNITED STATES. *The Bank of North America.* During the war of the revolution, the country being extremely poor, with few industries but agriculture, and quite denuded of the precious metals, from a heavy and long continued adverse foreign trade, the congress of the United States experienced great difficulty in providing the requisite means for carrying on hostilities. On May 10, 1775, soon after the battle of Lexington, congress made preparation to issue continental paper, $2,000,000 of which were put in circulation on June 22 following. From month to month these issues, which in the aggregate reached $300,000,000, depreciated, until eventually they became entirely valueless, notwithstanding the passage of laws making them a legal tender for the payment of debts. On May 17, 1781, a plan of a national bank was submitted to congress

by Robert Morris of Pennsylvania, the principal provisions of which were as follows: The capital to be $400,000, in shares of $400 each; that each share be entitled to a vote for directors; that there be 12 directors chosen from those entitled to vote, who at their first meeting shall choose one as president; that the directors meet quarterly; that the board be empowered from time to time to open new subscriptions for the purpose of increasing the capital of the bank; statements to be made to the superintendent of the finances of America; that the bank notes payable on demand shall by law be made receivable for duties and taxes in every state, and from the respective states by the treasury of the United States; that the superintendent of the finances of America shall have a right at all times to examine into the affairs of the bank. On May 26 congress passed the following: "Resolved, that congress do approve of the plan for the establishment of a national bank in these United States, submitted for their consideration by Mr. R. Morris, May 17, 1781, and that they will promote and support the same by such ways and means, from time to time, as may appear necessary for the institution and consistent with the public good; that the subscribers to the said bank shall be incorporated agreeably to the principles and terms of the plan, under the name of 'The President, Directors, and Company of the Bank of North America,' so soon as the subscription shall be filled, the directors and president chosen, and application for that purpose made to congress by the president and directors elected." On Dec. 31 following congress passed "an ordinance to incorporate the subscribers to the bank of North America." The first president was Thomas Willing, and the bank became at once a most important auxiliary in aid of the finances of the government, and so continued to the conclusion of the war. This institution was also incorporated by the state of Pennsylvania, on April 18, 1782. The bank commenced business in January, 1782, with a capital of $400,000, of which $254,000 had been subscribed by the government. In the year 1785, when an ill feeling had arisen between the government of the state of Pennsylvania and the bank, the former repealed the charter which it had granted in 1782. The bank, however, continued its operations under the charter granted by the general government till 1787, when it was rechartered by the state of Pennsylvania. It has from time to time been rechartered, and now exists under the national system with a capital of $1,000,000, and a surplus of $1,000,000.—*The First Bank of the United States.* On the organization of the government of the United States under the constitution, Alexander Hamilton, in his masterly report on the finances in 1790, urged upon congress the importance of establishing a bank of the United States. This measure, although it met with vigorous opposition in the house of representatives, passed that body Feb. 8, 1791, having on Jan. 20 passed the senate with but slight resistance. The following abstract of the 12 clauses of the charter will give an idea of the act: 1. The capital shall be $10,000,000, to be divided into 25,000 shares of $400 each. 2. Any person, copartnership, or body politic may subscribe for such number of shares as he, she, or they may think proper, not exceeding 1,000, except as regards the subscription of the United States. The subscriptions, except those of the United States, shall be payable one fourth in gold and silver, and the remaining three fourths in certain 6 per cent. stocks of the United States. 3. The subscribers are incorporated under the name and style of "The President, Directors, and Company of the Bank of the United States," and to continue till March 4, 1811. The bank is authorized to hold property of all kinds, inclusive of its capital, to the amount of $15,000,000. 4. Twenty-five directors are to be elected by a plurality of the votes cast, on the first Monday in January of each and every year, for one year only, and the directors are empowered to choose one of their number for president. 5. As soon as the sum of $400,000 is received on account of the subscriptions, in gold and silver, on proper notice being given, the bank may be organized. 6. The directors are authorized to choose such other officers, clerks, and servants as may be necessary for the bank, and shall otherwise manage the affairs of the bank. 7. This clause prescribes the "rules, restrictions, limitations, and provisions which shall form and be fundamental articles of the constitution of said corporation." 8. If the corporation, or any person or persons for or to the use of the same, shall buy or sell any goods, wares, or merchandise whatsoever, contrary to the provisions of this act, such person or persons shall forfeit and lose treble the value of said goods, wares, and merchandise, one half to the United States, and the remainder to the informer. 9. If the corporation shall lend to the government of the United States any sum of money to an amount exceeding $100,000, or to any state to an amount exceeding $50,000, or to any foreign prince or state (unless previously authorized by law), all and every person concerned in any way in causing the same to be lent shall for each and every offence, on conviction, forfeit and pay a sum treble the value of said loan or loans —one fifth to the informer, and four fifths to the United States. 10. Bills or notes of the bank payable in coin shall be taken in payments to the United States. 11. The president of the United States may within 18 months from April 1, 1791, cause a subscription to be made to the stock on behalf of the United States for an amount not exceeding $2,000,000, to be paid out of the moneys which shall be borrowed by virtue of either of two certain acts providing for the payment of the debt of the United States, "borrowing from the bank an equal

sum to be applied to the purposes for which the said moneys shall have been procured; reimbursable in 10 years in equal annual instalments, or at any time sooner, or in any greater proportions that the government may think fit. 12. That no other bank shall be established by any future law of the United States during the continuance of the corporation hereby created, for which the faith of the United States is hereby pledged." The bank was established in Philadelphia, with branches at different points. The dividends of the bank averaged from 8 to 10 per cent. per annum, being much below those of the bank of North America in previous years; which, in the words of a distinguished writer, now "gradually declined as other banks sprang into existence." In 1808, three years prior to the expiration of the charter, application was made to congress for a renewal of the charter, and Mr. Gallatin, the then able head of the treasury department, in obedience to a resolution of the senate, reported to congress upon the memorial. Mr. Gallatin proposed some changes in the new act of incorporation, and highly recommended the reincorporation of the bank, for which he gave his reasons in a clear and conclusive manner. Nothing, however, was done. From time to time the matter was brought to the attention of congress, until Feb. 5, 1811, when a bill was brought forward, but was on Feb. 20 defeated by the casting vote of Vice President Clinton. The bank was now obliged to wind up its affairs, which was done without at all convulsing the country. Within about 18 months the stockholders had received 88 per cent. on their stock. On finally closing its business, the assets yielded to the stockholders a premium over the par value of 8½ per cent. An application had previously been unsuccessfully made to the legislature of Pennsylvania for the recharter of this institution, with a capital of $5,000,000.—*Second Bank of the United States.* During the war of 1812–'15 the government, which was embarrassed for the want of means, had received important aid from the banks. By this means the banks, with the exception of those in New England, were, in August and September, 1814, driven to a suspension of specie payments. The finances of the government were now in a terrible condition, when, on Oct. 6, Alexander J. Dallas was called to the head of the treasury department. Never before had there been greater need of a master mind in that important office. Within less than a fortnight the new secretary communicated to congress a report of extraordinary ability, in which he strongly recommended the establishment of a national bank, as the remedy required again to bring the finances into order. Various plans for a bank were brought forward in congress, which resulted in nothing, until, on Jan. 20, 1815, a bill was passed. This bill was vetoed by President Madison, on the ground that it would not accomplish the objects rendered necessary by the state of the revenue and the condition of the country. On April 3, 1816, however, a bill for a bank of the United States, which had previously passed the house of representatives, was adopted by the senate, and, receiving the signature of the president, became a law. The corporate title of this institution was "The President, Directors, and Company of the Bank of the United States." Its capital was to be $35,000,000, composed of 350,000 shares of $100 each; $7,000,000 of the stock was to be subscribed by the United States, and the remaining $28,000,000 by individuals, companies, or corporations. The charter was to extend to March, 3, 1836, and the bank was authorized to organize and commence business so soon as $8,400,000, exclusive of the subscription of the United States, was paid in. It was prohibited from lending on account of the United States more than $500,000, or to any state more than $50,000, or to any foreign prince or power any sum whatever, without the sanction of law previously being obtained. The bank went into operation Jan. 7, 1817, and through its agency the other banks throughout the country were enabled and induced to resume specie payments. An unsuccessful effort was made in 1818 to repeal the charter, on the ground of alleged mismanagement. President Jackson in his message of December, 1829, intimated that "constitutional difficulties" might interfere to prevent its recharter, and expressed the desire that congress might take the matter into early consideration. Committees of both houses reported favorably to a recharter, but no application was made by the bank until the session of 1831–'2. On July 4, 1832, a bill rechartering the bank was sent to the president, who on the 10th of the same month returned it with a message stating his objections to it. An effort now being made to pass the bill over the veto of the president, but without success, the bank on March 3, 1836, ceased to act under the charter granted by the United States, but was in the same year rechartered by the state of Pennsylvania, with the same capital. On Oct. 9, 1839, the United States bank suspended specie payments for a second time, having previously suspended in 1837, a measure which was adopted immediately by all the banks throughout the state of Pennsylvania, and eventually, with comparatively limited exceptions, throughout the country. On Jan. 15, 1840, in compliance with an act of the legislature, it resumed specie payments—to suspend finally on Feb. 4. On winding up its affairs, after payment of its debts, there remained nothing to its stockholders, the entire capital having been sunk.—*State Banks.* Prior to the passage of the act "to provide a national currency," &c., by congress, in 1864, the charter of all banks of issue and deposit was by the several states. No fewer than 1,400 of these state institutions existed in 1856–'7. In the New England states at that date there were 507 banks and branches, with a capital of $114,611,752. An important feature in New England banking at that time

was the "Suffolk bank system," through which the notes of all New England banks were collected and redeemed at the Suffolk bank in Boston, each bank making a stipulated deposit for that purpose, amounting in the aggregate to $300,000.—*National Banks.* The exigencies of the civil war, 1861–'5, requiring that the government of the United States should have other than the ordinary demand among the people for the absorption of the bonds which it was from time to time issuing, led to the law of 1864 entitled "An act to provide a national currency, secured by a pledge of United States bonds, and to provide for the circulation and redemption thereof." This act was approved June 3, 1864, and provides among other things for a separate bureau in the treasury department, the chief officer of which shall be denominated the comptroller of the currency, and it shall be under the general direction of the secretary of the treasury; that associations for carrying on the business of banking may be formed, consisting of not less than five persons; that no association shall be organized under this act with a less capital than $100,000, nor in a city whose population exceeds 50,000 with a less capital than $200,000, but that banks with a capital of not less than $50,000 may, with the approval of the secretary of the treasury, be established in any place the population of which does not exceed 6,000; that such associations shall have existence for 20 years, and may exercise the general powers of banking companies; the capital shall be divided into shares of $100 each; that stockholders shall be equally and ratably liable to the extent of the stock for the debts and contracts of the bank; that every association, preliminary to the commencement of banking business, shall transfer United States bonds to an amount not less than $30,000, and not less than one third of the capital stock paid in; that upon the proper examination being made into the affairs of the proposed institution, it shall be entitled to receive from the comptroller of the currency circulating notes equal in amount to 90 per cent. of the current market value of the bonds transferred, but not exceeding 90 per cent. of the par value of said bonds; that notes to an amount not exceeding $300,000,000 may be issued under this act; that these notes shall be received at par in all parts of the United States in payment of taxes, excises, public lands, and all other dues to the United States, except for duties on imports, and also for all salaries and other debts and demands owing by the United States to individuals, corporations, and associations within the United States, except interest on the public debt, and in redemption of the national currency; that the rate of interest to be charged shall be that allowed by the laws of the state or territory where the bank is located, or in the absence of any such rate, not exceeding 7 per cent.; that each of the banks in St. Louis, Louisville, Chicago, Detroit, Milwaukee, New Orleans, Cincinnati, Cleveland, Pittsburgh, Baltimore, Philadelphia, Boston, New York, Albany, Leavenworth, San Francisco, and Washington city shall at all times have on hand in lawful money of the United States an amount equal to at least 25 per cent. of the amount of its notes in circulation and its deposits, and that all others shall keep a reserve of not less than 15 per cent.; that every association shall pay to the treasurer of the United States in the months of January and July ½ per cent. each half year on the average amount of its notes in circulation, and a duty of ¼ per cent. each half year upon the average amount of its deposits, and a duty of ¼ per cent. each half year on the average amount of its capital stock beyond the amount invested in United States bonds; that any state bank may become a national bank under this act. By an act amending the foregoing act, approved March 3, 1865, it was provided that notes shall be issued to associations according to capital as follows: to each not exceeding $500,000, 90 per cent.; to each whose capital exceeds $500,000, but does not exceed $1,000,000, 80 per cent.; to each whose capital exceeds $1,000,000, but does not exceed $3,000,000, 75 per cent.; to each whose capital exceeds $3,000,000, 60 per cent.; and that $150,000,000 of the entire amount of circulating notes authorized to be issued shall be appropriated to associations in the states, in the District of Columbia, and in the territories, according to representative population, and the remainder shall be apportioned by the secretary of the treasury among associations formed in the several states, in the District of Columbia, and in the territories, having due regard to the existing banking capital, resources, and business of such state, district, or territory. By an act to provide ways and means for the payment of compound-interest notes, approved March 2, 1867, it was provided that temporary loan certificates, bearing 3 per cent. per annum interest, may be issued to an amount not exceeding $50,000,000, and used for this purpose; and further, that said certificates may constitute for any national bank a part of the reserve provided for by law, provided that not less than three fifths of the reserve of such bank shall consist of lawful money of the United States. By a further act approved July 25, 1868, provision was made for the issue of an additional amount of $25,000,000 of temporary loan certificates. By an act approved July 12, 1870, it was provided that $54,000,000 additional circulation may be issued to national banks; that the circulation of no bank thereafter organized shall exceed $500,000; that at the end of each month an amount of certificates of indebtedness equal to the amount of notes issued during that month shall be called in, paid, and cancelled. This act also provides for the issue of circulating notes redeemable in coin to such banks as may be instituted, the circulation of no such bank under said act to exceed $1,000,000, these notes to be secured by pledge of United

States bonds. This act further provided for the redistribution of $25,000,000 of bank circulation to banks in states not having their proper proportion, to be taken from banks in states having circulation in excess. This, however, was not to be done until the full amount of $54,000,000 of new circulation provided for in this act had been applied for and issued. Under the provisions of this act four gold banks have been authorized: one in Massachusetts, with a capital of $200,000—circulation issued, $120,000; and three in California, with an aggregate capital of $2,800,000—circulation issued, $1,481,100. By means of a provision in "An act to amend an act entitled 'An act to provide internal revenue,'" &c., approved March 3, 1865, congress effectually drove from circulation the notes of all banks chartered under state laws by taxing all such circulation paid out by them 10 per cent. per annum. On Oct. 3, 1872, there were in operation in the United States 1,919 national banks, and their condition was as follows:

RESOURCES.

Loans and discounts	$872,520,104 35
Overdrafts	4,677,819 12
United States bonds to secure circulation	382,046,400 00
United States bonds to secure deposits	15,479,750 00
United States bonds and securities on hand	12,242,550 00
Other stocks, bonds and mortgages	23,533,151 73
Due from redeeming and reserve agents	80,717,071 30
Due from other national banks	34,486,593 87
Due from state banks and bankers	12,976,878 01
Real estate, furniture, and fixtures	32,276,498 17
Current expenses	6,310,428 79
Premiums	6,546,848 54
Checks and other cash items	14,916,784 34
Exchanges for clearing house	110,086,315 37
Bills of other national banks	15,734,098 00
Bills of state banks	53,198 00
Fractional currency	2,151,747 88
Specie	10,229,756 79
Legal tender notes	102,074,104 00
Clearing-house certificates	8,632,000 00
United States certificates of deposit	6,710,000 00
Three per cent. certificates	1,555,000 00
	$1,755,857,098 24

LIABILITIES.

Capital stock	$479,629,174 00
Surplus fund	110,257,516 45
Undivided profits	46,623,784 50
National bank notes outstanding	333,495,027 00
State bank notes outstanding	1,567,143 00
Dividends unpaid	3,149,749 61
Individual deposits	813,290,671 45
United States deposits	7,853,772 41
Deposits of United States disbursing officers	4,563,333 79
Due to national banks	110,047,347 67
Due to state banks and bankers	33,789,083 82
Notes and bills rediscounted	5,549,431 88
Bills payable	6,040,562 66
	$1,755,857,098 24

The distribution of national banking capital throughout the country is very unequal, and based upon no sound or equitable principles. This is shown by the fact that Boston, with a population of 250,000 and a manufacturing industry of $111,000,000 per annum, has 48 banks with a capital of $48,600,000 and circulation of $26,059,468; while Philadelphia, with a population of 674,000 and a manufacturing industry of $325,000,000 per annum, has but 29 banks with a capital of $16,235,000 and a circulation of $11,383,620.—In several of the states banks exist under state charters, but without circulation. In the state of New York there are 70 state banks, having on Sept. 21, 1872, a combined capital of $24,845,040; circulation (not yet sent in for redemption), $126,927; deposits, $78,305,491; loans, $66,076,361; and specie, $1,261,772. In Pennsylvania, and especially in Philadelphia, the effort has been made, and to some extent with success, to supply the great deficiency of national banks with state banks—the former being quite inadequate to the present large and rapidly extending manufacturing business and trade of that city.—*Banks of Canada.* The condition of the Canada banks, Sept. 30, 1872, was as follows: paid-up capital, $44,157,690; circulation, $24,422,451; deposits, $57,581,646; specie, $6,601,380; loans to government, $557,238—to corporations and individuals, $109,521,798.—*Clearing House.* The clearing house is an institution founded, not merely upon the idea of saving time and trouble in the use of the precious metals, but also of circulating notes. All the banks and bankers associated as members of a clearing house are for this purpose, as it were, but one individual. The clearing house of London, the first of its kind, originated among the bankers of that city, whose transactions in the checks, bills, and drafts drawn upon each other became so large as to call for the daily and even hourly use of vast sums in bank notes by all of them. Appreciating how readily the debits and credits respectively due or held by them might be set off the one against the other, they formed the clearing house, where up to 4 o'clock each day all drafts, bills, &c., drawn upon each individual member were taken. The system of the London clearing house has recently been much extended and improved, and all balances are settled by checks drawn upon the bank of England—no bank notes being required at all. Clearing houses exist in New York, Philadelphia, Boston, and other cities of the United States. The system in that of Philadelphia is equal and in some respects superior to that of any other in the United States. The clearings are made each morning at 8.30, just before which hour a messenger and a clerk from each bank are at the clearing house. The clerks take their seats inside a series of desks arranged in the form of a hollow oval. Each messenger brings with him from his bank a sealed package for each other bank, containing all the checks or drafts on such bank. The name of the bank sending and that of the bank to which it is sent are printed on each package, and the amount sent is written thereon. The messengers take their places near the desks of their respective banks, and they have with them tabular statements of the amount sent to each bank and the aggregates. These are exhibited to the respective clerks and noted by them on the blank forms. At 8.30 precisely the manager calls to order and gives the word, when all the mes-

sengers move forward from left to right of the clerks, handing in to those clerks the packages addressed to their respective banks, and taking receipts for them on their statements. When the circuit is completed all the packages have been delivered and received, and the amounts and the aggregates, both debtor and creditor, noted by the clerks. When the clerks find all correct the messengers take the packages received, and return to bank. The several clerks then pass round a memorandum of the debits, credits, and balance, each of his respective bank. When these memoranda have made the circuit, each clerk has on his statement the debits, credits, and balance, whether debtor or creditor, of each bank. If these debits and credits and debtor and creditor balances are found to balance, the clerks now leave the clearing house. If not, they remain until the error or errors are discovered. The balances due by the several banks are paid in to the clearing house that day by 11.30 A. M., and are receivable by the creditor banks by 12.30 P. M. A second clearing of drafts, &c., received by the morning's mail, is made at the clearing house by the messengers at 11.30 A. M. Each bank is obliged daily to furnish to the clearing house a statement of its condition at the end of business hours on that day; and tables are daily furnished to the several banks of the condition of all the banks in the clearing house. Complete records of all the transactions, of the state of the banks, &c., are preserved in the books of the clearing house, precisely as are the business transactions of any bank, or other corporation or mercantile firm. From October, 1871, to October, 1872, the operations of the New York clearing house were as follows: exchanges, $33,844,369,568; cash balances, $1,428,582,707; average daily exchanges, $105,964,277; average daily balances, $3,939,265, or less than 3¾ per cent.; so that by the intervention of this institution $3 75 are made to do the work which would require $100 without it, and which in fact does require $100 in the country, where men are isolated. (See also SAVINGS BANK.)

BANK BAN, or **Ban Bank,** a Hungarian military governor, executed with his whole family by order of King Andrew II. (1205–'35). Bank's wife having been seduced by the queen's brother Eckart, with the queen's connivance, he placed himself at the head of a mob who stormed the palace in the king's absence and cut the queen to pieces, Eckart barely escaping with his life to Styria (1214). Katona's *Bank-bán*, a celebrated Hungarian drama (Klausenburg, 1827), has been translated into German (Leipsic, 1858). Grillparzer also dramatized the subject in *Ein treuer Diener seines Herrn* (Vienna, 1830).

BANKRUPT (low Lat. *bancus*, a bench, and *ruptus*, broken), an insolvent debtor. In its more ordinary acceptation, bankruptcy expresses inability to pay one's debts, being in that sense the same as insolvency. The theory of bankruptcy in England until recently has been, that it was a criminal offence, and the proceeding was in form hostile to the party charged with being bankrupt. The first bankrupt law was enacted in the reign of Henry VIII., in which act the persons amenable to its provisions are described as "those who obtain other men's goods on credit, and then suddenly flee to parts unknown, or keep house, and there consume their substance without paying their debts." In subsequent statutes the character of the bankrupt was defined with more precision, and by the term was generally understood a trader who should do certain acts specified in the statutes which were declared to constitute bankruptcy. The English bankrupt laws were wholly remodelled by act 32 and 37 Victoria, c. 71, on more humane principles. Under that act all persons may be adjudged bankrupt, whether they be traders or not. A person becomes a bankrupt when adjudged so by the court, upon the petition of a creditor having a liquidated and unsecured debt of not less than £50, or of several creditors having like debts to that amount. But before such petition can be presented, the debtor must have committed some one of the acts of bankruptcy specified in the statute, which are: 1, making a general assignment of his property for the benefit of creditors; 2, making a fraudulent conveyance, gift, delivery, or transfer of property; 3, doing, with intent to defeat or delay his creditors, any of the following acts: departing from or remaining out of England, or (being a trader) departing from his dwelling house or otherwise absenting himself, or beginning to keep house, or suffering himself to be outlawed; 4, filing in the manner prescribed by the rules of court a declaration that he is unable to pay his debts; 5, having execution for a debt of £50 or upward levied upon his goods; 6, having neglected to pay or secure or compound the prisoner's debt after having had a debtor's summons served upon him, being a trader, within seven days, and being a non-trader, three weeks after service. An adjudication founded upon any of these acts of bankruptcy will not, however, be granted unless the petition be presented within six months after the act was committed. The act upon which the petition is founded, or the earliest act of bankruptcy proved to have been committed within the twelve months next preceding the presentation of the petition, constitutes the commencement of the bankruptcy. No creditor is allowed to commence or prosecute any proceeding against the bankrupt after the adjudication unless by leave of the court, and all the ordinary remedies are taken away except those of the secured creditors in respect to their securities. Creditors must prove their demands under the bankruptcy, and for the purposes of a distribution of the property they are allowed to appoint a trustee, and also from their own number a committee of inspection for the purpose of guiding, and in some measure controlling, the trustee in the discharge of his

duties. The title of the trustee relates back to the commencement of the bankruptcy. The creditors at any meeting have the right to give directions to the trustee as to the manner in which the property shall be administered by him. Property held by the bankrupt in trust, the tools of his trade if any, and the necessary wearing apparel and bedding of himself and his family—such tools, apparel, and bedding not exceeding in value £50—will not pass to the assignee; but property acquired by or devolving upon the bankrupt pending the proceedings will pass, and also the capacity to exercise or take proceedings to exercise all powers over property for his own benefit. If he is a trader, goods and chattels in his hands as reputed owner, with the permission of the true owner, will also pass to the trustee. Until the appointment of a trustee, and during any vacancy which may occur, the registrar of the court is the trustee. When the property has been realized the court declares the bankruptcy closed, and the bankrupt may apply for his discharge. This is only granted where the assets pay 10*s.* in the pound, or where the creditors shall have passed a resolution by a majority in number representing three fourths in value of the debts to the effect that a discharge should be granted. A discharge releases the bankrupt from all debts provable under the bankruptcy, except those which he incurred by means of any fraud or breach of trust, and those of which he obtained forbearance by means of fraud, and also those due to the crown or relating to the revenue; but of these last he may be discharged if the commissioners of the treasury consent thereto. If the bankrupt fails to obtain his discharge, a period of three years is given him during which, if he pays to his creditors such sum as, together with the dividends already received by them, make up 10*s.* in the pound, he is to obtain his discharge. In the mean time debts provable in bankruptcy are not to be enforced against his property; but if at the expiration of that time he has not thus obtained his discharge, debts provable under the bankruptcy stand as judgment debts against him, but without interest.—In the United States, power is conferred upon congress by the constitution to establish a uniform system of bankruptcy. When this power is exercised, it supersedes the state insolvent laws, which are in their nature similar to the bankrupt acts. It was first exercised by act of April 4, 1800, repealed Dec. 19, 1803; again by act of Aug. 19, 1841, repealed in 1843; again by act of March 2, 1867, now in force. This act embraces in its provisions any person residing within the jurisdiction of the United States owing debts to the amount of more than $300 provable under it. It contains what are called voluntary provisions, under which an insolvent debtor may himself be the petitioner for his discharge, and involuntary provisions, under which the creditors become petitioners when they believe an act of bankruptcy has been committed. No debt created by the fraud or embezzlement of the bankrupt, or by his defalcation as a public officer, or while acting in any judiciary capacity, is barred by a certificate of discharge issued under the act. Original jurisdiction of the proceedings is possessed by the United States district courts, but registers in bankruptcy are appointed, by whom the major part of the business is transacted. Contested issues are adjourned by the registers for hearing in court, and the debtor, who disputes the allegations of the creditors against him may demand trial by jury. The acts of bankruptcy enumerated are as follows: 1, departing from the state, territory, or district of which the person is an inhabitant, with intent to defraud his creditors; 2, remaining absent with the like intent; 3, concealing himself to avoid the service of legal process for the recovery of any debt provable under the act; 4, concealing or removing property to avoid legal process; 5, making an assignment, gift, sale, conveyance, or transfer of his estate, property, rights, or credits, with intent to delay, hinder, or defraud creditors; 6, being under arrest for a period of seven days on an execution upon a debt provable under the act, for more than $100; 7, being actually imprisoned for more than seven days in a civil suit founded on contract, for $100 or upward; 8, making any payment, gift, grant, sale, conveyance, or transfer of money or other property, estate, rights, or credits, or giving any warrant to confess judgment, or procuring or suffering his property to be taken on legal process while bankrupt or insolvent, or in contemplation of bankruptcy or insolvency, with intent to give a preference to one or more of his creditors, or to persons liable for him as sureties or otherwise, or with intent by such disposition of his property to defeat or delay the operation of the act; 9, a banker, broker, merchant, trader, manufacturer, or miner, fraudulently stopping payment, or having stopped or suspended, and not resumed payment of his commercial paper within 14 days. In the distribution of the bankrupt's estate the following demands are preferred: 1, the cost of the proceedings; 2, all demands owing to the United States; 3, all demands owing to the state in which the proceedings are had; 4, wages due to any operative, clerk, or house servant, to an amount not exceeding $50 for labor performed within six months next preceding the first publication of the notice of proceedings in bankruptcy; 5, all other debts which by the laws of the United States are or may be entitled to priority, in like manner as if the act had not been passed. Other demands are paid ratably, except that specific liens are not disturbed or devested, unless where created in contemplation of bankruptcy or in fraud of the law. There are saved to the bankrupt his necessary household furniture and other articles designated by the assignee, not exceeding in value $500; the wearing apparel of himself and family; the uniform, arms, and

equipments of any one who is or has been a soldier in the militia or army; and any other property that is or may be exempt from levy and sale by the laws of the United States or by those of the state in force in 1867. With the exception of the exempt property, the assignment under the act carries to the assignee all the estate of the bankrupt, and dissolves all attachments of any of the property made on mesne process within four months previous to the commencement of the proceedings. A discharge is granted to the bankrupt as a matter of course unless he has been guilty of some act forbidden by the statute, or of some fraud upon creditors, or lost property by gaming, or suffered voluntary loss or destruction to his estate; but in cases commenced a year after the act went into operation, no discharge is granted unless the assets pay 50 per cent. of the debts, or a majority in number and value of the creditors assent; and in cases of second bankruptcy no discharge is granted unless the assets pay 70 per cent., or unless three fourths in value of the creditors assent, or unless the debts owing at the time of the previous bankruptcy have been paid or released. For the following acts the bankrupt is punishable criminally: Secreting or concealing property belonging to his estate; concealing, destroying, altering, &c., books, papers, &c., with fraudulent intent; making gifts, payments, &c., with the like intent; spending any part of his estate in gaming; fraudulent omission of property from the schedule; failing to disclose knowledge of fraudulent claims against the estate; attempting to account for any of his property by fictitious losses or expenses; obtaining fraudulent credit within three months before commencement of the proceedings, and with intent to defraud creditors; making disposition of property bought on credit and not paid for, otherwise than by *bona fide* transactions in the ordinary way of his trade, within three months before the commencement of proceedings. The maximum punishment that may be inflicted is three months' imprisonment with or without hard labor.—In Scotland and Ireland the bankruptcy laws are in their effect substantially the same as in England. In France, the tribunal of commerce proceeds summarily to sequester the estate of a bankrupt merchant, and apply the same in payment of his debts. From the day of failure the bankrupt is divested of all title to or control over his property; his counting-house is closed, and his effects put under seal; a member of the court is appointed a commissioner to take charge of the effects, with the aid of certain agents, who have surveillance of the same until the creditors are convened for the nomination of syndics (trustees); and the debtor himself in the mean time may be imprisoned or compelled to give security to undergo examination in respect to his property. The family of the bankrupt are entitled to retain their apparel and household furniture; the wife also retains any interest belonging to her by a marriage stipulation, or which she has herself acquired by the use of her own separate estate. The proceeds of the bankrupt's estate are distributed by the syndics to the creditors; the bankrupt is subject to imprisonment, or to be condemned to forced labor, in case of fraudulent bankruptcy or of insolvency clearly traceable to imprudence or extravagance.—There are similar proceedings in all the commercial countries of Europe, some more and some less severe, but all of them being founded upon the presumption of fraud having been committed by the bankrupt, from which he is to purge himself upon a strict investigation of his affairs. In Holland he is discharged from all further liability for his debts upon getting a certificate from one half of his creditors, to whom is due five eighths of his debts.

BANKS, a N. E. county of Georgia, watered by Broad river and its affluents; area, 250 sq. m.; pop. in 1870, 4,973, of whom 921 were colored. The chief productions in 1870 were 11,314 bushels of wheat, 114,167 of Indian corn, 11,069 of oats, 12,263 of sweet potatoes, and 398 bales of cotton. Capital, Homer.

BANKS, John, an English dramatist of the 17th and 18th centuries; the dates of his birth and death are unknown. He was a London attorney, and left his profession to write for the stage. He published seven tragedies between 1677 and 1696. Of these, "The Unhappy Favorite," founded on the fate of the earl of Essex (beheaded in the reign of Elizabeth), was a stock play for a long time, and was freely used by later playwrights. His dramas were popular, but their literary merit is small.

BANKS, Sir **Joseph,** an English naturalist and traveller, born in London, Jan. 4, 1743, died June 19, 1820. At Eton school he first showed a taste for botany, which he cultivated afterward with enthusiasm at Oxford. In 1764, at the age of 21, he came into his paternal property, which was considerable. Two years later he became fellow of the royal society, after which he made a voyage to Newfoundland and Labrador, with Lieut. Phipps of the royal navy, to collect plants. On his return he formed an intimacy with Dr. Solander, a Swede, the pupil of Linnæus. The four years following Mr. Banks devoted to the study of botany and natural history, and through the interest of the earl of Sandwich, who was then first lord of the admiralty, was appointed with Dr. Solander naturalist to the expedition under the command of Capt. Cook, which sailed from England in August, 1768, to visit Tahiti for the purpose of observing the transit of Venus. In this voyage, which lasted three years, he visited Tierra del Fuego, Tahiti, New Zealand, and New South Wales. In 1772 he made a voyage to Iceland with Dr. Solander, visiting the Hebrides on his return, and discovering the columnar formation of the rocks surrounding the caves of Staffa. On the retirement of Sir John Pringle from the presidency of the royal society in 1777, Mr. Banks was chosen

to that office, which he held for 42 years. In 1781 he was created a baronet. Soon after, on the sudden death of Dr. Solander, he abandoned his purpose of publishing the results of his observations and discoveries in botany. In 1795 he received the order of the Bath, in 1797 was made a privy councillor, and in 1802 was chosen a member of the national institute of France. With the exception of brief memoirs or occasional communications to the transactions of societies, he published no account of his large collections on natural history, or of the results of his studies and observations. A small work on "Blight, Mildew, or Rust in Corn," and another on "Merino Sheep," are his only published books. He dispensed his large fortune with liberality, aiding in most of the scientific enterprises of his time, and relieving the necessities of scholars and travellers. The African association and the Botany Bay colony owed their origin to him. His immense library and scientific collections were bequeathed to the British museum.

BANKS, Nathaniel Prentiss, an American statesman and general, born in Waltham, Mass., Jan. 30, 1816. While a boy he worked in a cotton factory in his native village, of which his father was overseer, and afterward learned the machinist's trade. He devoted his leisure hours to study, and at an early age lectured before political meetings, lyceums, and temperance societies; he afterward became editor of the village paper of Waltham, and received an office under the Polk administration in the Boston custom house. About this time he was admitted to the bar, and in 1849 was elected to the house of representatives of Massachusetts. In 1851 he was chosen speaker of the house as one of the prominent advocates of the "coalition" between the democrats and the freesoilers, by which the ancient rule of the whigs was overthrown in Massachusetts. He was again elected the following year by the same combination, also representative to the ensuing congress. In the summer of 1853 he was president of the convention called to revise the constitution of the state. During his first term in congress he withdrew from the democratic party, and in 1854 was reëlected with the support of both the "know-nothing" or American and republican parties, and in December, 1855, was adopted as the candidate of the latter for speaker. After a contest of more than two months, he was elected on the 133d ballot by a small plurality. He was a member of the next congress, and was nominated in separate conventions of the American and republican parties for the office of governor of Massachusetts, to which he was elected in November, 1857, and reëlected in 1858 and 1859. In 1860 he succeeded Capt. G. B. McClellan as president of the Illinois Central railroad; but on the breaking out of the civil war, in 1861, he received a major general's commission, and was assigned to the 5th corps of the army of the Potomac, with his command at first on the upper Potomac, and afterward in the valley of the Shenandoah. A portion of his troops fought with success at Winchester, March 23, 1862. On May 24 he was attacked by the confederate Gen. T. J. Jackson at Strasburg, and forced to retreat rapidly to the Potomac. As commander of a corps under Gen. Pope he fought the battle of Cedar Mountain, Aug. 9; and after participating in Gen. Vogel's movements in the valley of Virginia, in September he was put in command of the defences of Washington. In December he succeeded Gen. Butler as commander of the department of the gulf, with his headquarters at New Orleans. In April, 1863, he captured Opelousas, and in July took Port Hudson, completing the opening of the Mississippi river. In the spring of 1864 he made an unsuccessful expedition up the Red river, and in May of that year was relieved of his command. He was elected to congress in his old district in November, 1864, and was reëlected in 1866, 1868, and 1870, serving as chairman of the committee on foreign relations. In the canvass of 1872 he took an active part in favor of the election of Horace Greeley as president of the United States.

BANKS, Thomas, an English sculptor, born at Lambeth, Dec. 22, 1735, died in London, Feb. 2, 1805. His father gave him a good education, and then placed him under the instruction of Kent, the architect. In 1770 he won the gold medal of the royal academy. His group of "Mercury, Argos, and Io" fairly established his reputation. In 1772 he went to Rome as the academy's foreign student, and spent three years there studying the antique models and exercising his own talents. He produced several groups, among them "Caractacus pleading before Claudius," and "Psyche and the Butterfly." The latter was purchased by the empress Catharine II., who invited him to visit St. Petersburg, where he was cordially received and commissioned to execute a group called "Armed Neutrality." His masterpiece, the "Mourning Achilles," was placed in the British institution. Elected a member of the academy, he presented to that institution a fine figure of a fallen Titan. His most popular work was a monument representing the infant daughter of Sir Brooke Boothby.

BANKSIA, a name given to several distinct genera of plants in honor of Sir Joseph Banks. The one to which the name properly applies belongs to the family of *proteaceæ*, and was named by Linnæus in honor of its discoverer, who accompanied Capt. Cook in his second voyage. The genus comprises several species, nearly all natives of Australia and the neighboring islands, where their beautiful forms and foliage are a conspicuous part of the landscape. The colonists consider their presence a mark of bad land. The leaves are hard, often broad, and closely cover the branches; the flower and fruit are in compact blunt cones, usually downy or woolly, and the flowers project so as to form a spike. As ornamental shrubs the

banksias have been much cultivated, and they will bear the climate of the southern states or of England with slight protection. All are easily propagated from seeds. The banksia of

Banksia speciosa.

Forster is to be referred to the genus *pimelea;* that of König to *castus*, a genus of the ginger family; and that of Bruce to *Brayera*, a genus of *rosaceæ*. The last, under the name of cusso, was found by the distinguished African traveller in the high country of Abyssinia, where a decoction of its leaves was used commonly as an authelmintic.

BANNACKS, Bonnacks, or **Paunaques,** a tribe of Indians of the Shoshonee family scattered over several of the territories and states of the Union. They were first found in the almost desert lands between the Saptin river and Salt lake, and between the Blue and Rocky mountains. At an early period they obtained horses and resorted to the bison plains and more fertile spots, and thus became a more closely connected tribe than Indians on foot. They are proud, brave, fine-looking men, though their women are represented as ugly. Those with the eastern Shoshonees, long under a friendly chief, Tahjee, have always been friendly to the whites. With the others there were for a time hostilities in 1866. They frequent the Yellowstone country to hunt, and range through northern Utah, Wyoming, southern Montana, Nevada, and Idaho. The two chief bands number apparently about 500 each, though in the ordinary returns some appear to be enumerated over again in different agencies. Their language is a dialect of the Shoshonee, but differs considerably from that of the Shoshonees proper. They have recently been placed on reservations where there is but little fish or game, and where they have been exposed to attacks from the Dakotas.

BANNEKER, Benjamin, a negro mathematician and astronomer, born at Ellicott's Mills, Md., Nov. 9, 1731, died in October, 1806. His maternal grandmother was a white woman, who liberated and married one of her slaves, and from her he learned to read and write. After his 50th year he commenced the study of mathematics and astronomy, and from 1792 till his death published almanacs prepared from his own calculations. Thomas Jefferson transmitted the first one in manuscript to the secretary of the Paris academy of sciences, and sent a complimentary letter to the author. Banneker assisted in running the boundary lines of the District of Columbia and in laying out the city of Washington. A book of his city calculations is preserved in the Maryland historical society at Baltimore, which association has published two sketches of his life.

BANNERET, a feudal title of military dignity, now extinct, ranking between the baron and the knight. The banneret was the lowest of the feudal dignitaries. He displayed a square banner on his lance, instead of the swallow-tailed pennon of the simple knight, and commanded a body of his own vassals, who should number at least 50. The title was usually conferred on the field by the king in person, as a reward for gallantry, and the ceremony consisted in cutting off the tails of the candidate's pennon. The title of knight banneret, a degree higher than the bachelor, appears in the time of Philip Augustus, and lasted until the creation of companies of ordnance by Charles VII. The first banneret in England, according to Froissart, was created by Edward I. After the institution of baronets by James I. the order dwindled away, and the last creation in England is generally accounted to have been by Charles I., who made Capt. John Smith a banneret for rescuing the royal banner at Edgehill; though George III. attempted to revive the dignity in 1797, when he conferred it upon Capt. Sir Henry Trollope, in whose ship he reviewed the fleet at the Nore.

BANNOCKBURN, a village of Stirlingshire, Scotland, about 3 m. S. E. of Stirling castle; pop. about 2,700. The large brook (burn) which flows through the town and gives it its name falls into the frith of Forth, and is said to have been named from the oaten cakes (bannocks) so common in that region. The town is the seat of woollen manufactures, and has long supplied the tartans worn by the Highland regiments of the British army. A battle was fought here, June 24, 1314, between the Scots under Robert Bruce and the English under Edward II. Edward, with nearly 100,000 men, including the flower of the English nobility, was met at Bannockburn by Bruce with about 30,000 men, and after a fierce contest was routed with a loss of 30,000. By this battle the independence of Scotland was secured, and Bruce was firmly seated upon the throne. Near the same place, at Sanchieburn, James III. was defeated by his rebellious subjects in 1488, and was assassinated in a mill near by, where he had taken refuge. The "bore stone" is still pointed out as the spot on which Bruce fixed his standard on the day of the battle.

BANNS OF MATRIMONY, a public proclamation of the intention of the parties named to enter into the state of matrimony, being a notice to any one to make objection if he knows of any reason why the marriage should not take place. The term seems to be derived from the Teutonic *ban,* an interdict, whence to put under ban in the German empire was to excommunicate or declare outlawry. The custom is traced to the early Christians, who interwove it into their ecclesiastical polity. Its introduction into France dates from the 5th century, and in other parts of Europe it was probably adopted about the same time, or was coeval with the establishment of Christianity, as the laws regulating it are everywhere very similar. In the French and English churches they were identical, and required the proclamation to be made on three successive Sundays in church, during the celebration of public worship. The object of publication was to prevent clandestine marriages, or those which for various reasons are unlawful, as also the effect of precipitancy. In England the banns of a marriage to be celebrated according to the forms of the established church are required to be published three weeks previous to the marriage, a modification of the old custom of oral proclamation; but the parties may dispense with this by procuring a license from a person authorized to grant it. In Scotland three weeks' publication is necessary to a regular, as distinguished from a clandestine marriage; and also in France, by the provisions of the *Code Napoléon.* In the United States the tendency of legislation has been toward the repeal of all statutes requiring publication. In the Roman Catholic churches of this country, however, it is the rule to publish the banns on two Sundays previous to the wedding, when both the parties to the marriage are Catholics.

BANQUO, a Scottish thane and warrior of the 11th century, celebrated as the progenitor of the royal house of Stuart, through his grandson Walter, first lord high steward of Scotland. He was assassinated by Macbeth in 1066, after having joined him in his conspiracy against King Duncan; but Shakespeare, instead of making him Macbeth's accomplice, represents him simply as his victim.

BANSHEE, or **Benshee,** in popular superstition, an invisible being, supposed to announce by mournful presence and voice the approaching death of some members of certain ancient houses in Ireland and Scotland. It was said that, on the decease of a hero, the harps of his bards voluntarily emitted mournful sounds. In later times it was popularly supposed that each family had its banshee, which gave warning of misfortune or haunted the scenes of past troubles.

BANTAM. I. A Dutch province forming the western end of the island of Java, separated from Sumatra by the strait of Sunda; area, 3,081 sq. m.; pop. in 1857, 577,107. The coasts are level, but the interior districts mountainous, and there are two active volcanoes, one of which, Karang, is 6,069 feet high. The chief productions are coffee, rice, sugar, indigo, tea, cinnamon, and bay salt. All of these, except rice and salt, are exotics. Pepper, which first attracted European adventurers, and made this country one of the most noted commercial points during the 17th century, is no longer cultivated. The wild animals include tigers, rhinoceroses, apes, and pigs. Cattle, buffaloes, and goats are extensively reared, and there are considerable fisheries on the coasts. The mass of the population of Bantam are of the Sunda nation, and speak its peculiar language; but on the coast they are mixed with Malays, Javanese, and others who speak Malay. Bantam was an independent state under a sultan prior to the Dutch dominion. It was first visited by the Portuguese, under Henrique Lemé, in 1511. The Dutch, under the two brothers Houtman, came in 1596; and one of the brothers was captured and held prisoner for some time by the sultan. The English made their first appearance here in 1602, and were engaged in almost constant hostilities with their European rivals, but the English and Portuguese were finally driven out by the Dutch. For a long time the district was held as a sort of dependency by the Dutch East India company until 1843, when the last of its rajahs was banished to Surabaya, at the further end of Java, and the country made a province. There are 41 small islands and islets, chiefly in the strait of Sunda, which belong to the government of this province. **II.** A town, formerly capital of the above described province, situated at the head of a bay on the N. coast of the island, 15 m. from the strait of Sunda and 61 m. W. of Batavia; lat. 6° 2′ S., lon. 106° 9′ E. Before the arrival of Europeans it was a prosperous city with a rich trade in pepper. The Portuguese, English, and Dutch each had a factory here. The capital, however, was in 1816 removed to Sirang, some miles inland. The trade has gone to Batavia, the harbor has been obstructed by the increase of coral reefs and deposits from the rivers, and since the destruction of most of the houses by fire in 1817 the town has not been rebuilt.

BANTING, William, a London merchant, born in 1797, died in 1871. Owing to the wide circulation of his "Letter on Corpulence," published at first in 1863 in the newspapers, and subsequently in a pamphlet (6th ed., London, 1868; German translation, 10th ed., Leipsic, 1867), his name has been popularly associated with a dietetic method of curing corpulence. His prescriptions, however, are almost identical with those of Brillat-Savarin in his *Physiologie du goût* (1825). By the application of the method which he describes, under the guidance of William Harvey, a London surgeon, his weight was reduced from 202 pounds on Aug. 26, 1862, to 156 on Sept. 12, 1863, and to 150 in April, 1864, which latter weight he regarded as appropriate to his age

and stature, 5 feet 5 inches. He considers the diet as the principal point in the treatment of corpulence, though the quantity of food may be safely left to the natural appetite. The Banting method consists in the use of a large proportion of nitrogenous food, and in the rejection of all substances which have an excess of carbon. His main principle consequently is abstinence from all farinaceous, saccharine, or oily matter, which is converted into fat in the human system. He especially proscribes the use of bread, pastry, potatoes, butter, milk, beer, port wine, champagne, pork, herrings, eels, salmon, and the like; and recommends lean meat, poultry, game, fruit, dry toast, good claret, dry sherry, madeira, and green vegetables, permitting the moderate use of soft-boiled eggs and of cheese. In his dietary he first allowed the use of all vegetables excepting the potato, but afterward rejected parsnips, beets, turnips, and carrots. He had for many years tried bodily exercise, sea air, and bathing, and various other expedients and remedies; but only after the adoption of his dietetic system was he relieved from all symptoms of acidity, indigestion, and heartburn, and difficulties of locomotion, and enabled to dispense with knee bandages, which he had worn during 20 years. He rested well, with from six to eight hours' sound sleep. He spent much money for the diffusion of his views, and is said to have left a legacy for the endowment of an institution for the cure of corpulence.

BANTRY BAY, an inlet of the Atlantic on the S. W. coast of Ireland, county Cork, about 24 m. long from S. W. to N. E. and from 3 to 5 m. wide. Near the entrance, on the N. W. shore, is a harbor deep enough for the largest ships, called Bear Haven, sheltered by Bear island. Near the head of the bay, on the opposite shore, is the town of Bantry, 44 m. W. S. W. of Cork, with a roadstead protected by Whiddy island, which has three circular redoubts; pop. about 3,000. The town has an export trade in agricultural produce. In Bantry bay, in 1689, the French fleet which brought James II. to Ireland was victorious in an engagement with an English fleet under Admiral Herbert. It was also the place determined on as a rendezvous for the naval forces with which the French designed to invade England in 1796. The scenery around the bay is very picturesque. Near the N. shore, about 6 m. N. N. E. of Bear Haven, is the cataract of Hungry Hill, which pours down in a series of cascades the waters of three small lakes from an elevation respectively of 1,011, 1,126, and 1,360 feet.

BANZ, probably the finest and richest abbey of the Benedictines known in history, situated in the circle of Upper Franconia, Bavaria, 3 m. from Lichtenfels, on the Main. It was founded about the middle of the 11th century, and the monks became celebrated for their scientific attainments, their collections in natural history, and their library. It was destroyed during the peasants' war in the 16th century, but was soon after rebuilt. During the 30 years' war it was again destroyed and rebuilt, and its library and museums became more extensive and valuable than ever. The monastery was broken up in 1802, and the library and cabinets were dispersed among several institutions of Germany. The building was sold to the elector (afterward king) of Bavaria, and is now a summer residence of the royal family.

Baobab Tree.

BAOBAB (*Adansonia digitata*), a tree of enormous size, of the natural order *bombaceæ*, found in Africa, and especially in Senegal, though it has been met with on the banks of the White

Nile in the vicinity of the southern tropic. It was first discovered in 1748 by Adanson, in his voyage to Senegal, and it has been raised in England from seeds. It was carried to India many centuries ago, and one of great size is at Alipore near Calcutta. The trunk is from 15 to 60 ft. high and from 70 to 75 ft. in circumference. Its lower branches grow horizontally, frequently to the length of 60 ft., and hang to the ground, concealing the trunk. The leaves are large and abundant, of a dark green color, and divided into five radiating lanceolate leaflets; they are used by the natives as an antisudorific. The flower is large, white, with stamens gathered in a tube below, but spreading like an umbrella above, surmounted by a long, slender, and recurved style, terminated by a rayed stigma; petals reflexed and calyx deciduous. The fruit is a soft, pulpy, but dry substance, about the size of a quart bottle, enclosed in a long dull green woody pod; the pulp between the seeds tastes like cream of tartar, is used by the natives to give a flavor to porridge, and is much esteemed as an antifebrile. The baobab is also called monkey bread, sour gourd, and lalo plant. The natives make a strong cord from the fibres obtained from its pounded bark. To this end they often wholly strip the trunk of its bark, which is replaced by a new one. No external injury, not even fire, can destroy it from without, nor can it be injured from within, as it is quite common to find it hollow. Even cutting down does not exterminate it, for it continues to grow in length while lying on the ground, and its roots, which reach 40 or 50 yards from the trunk, retain their vitality. Livingstone judged that one of the baobab trees which he examined was at least 1,400 years old. It is subject to a very remarkable disease, a softening of its woody structure, until it falls by its own weight a mass of ruins. The natives use the trunk hollowed out as a place of deposit for executed criminals whom the law denies the rights of burial. In this position the bodies soon wither and dry up, having much the appearance of mummies.

BAPAUME, a town of France, in the department of Pas-de-Calais, situated in a wide plain, 13 m. S. S. E. of Arras; pop. in 1866, 3,174. It has several oil and soap manufactories. On Jan. 3, 1871, after some fighting on the preceding day in the vicinity, a battle took place at Bapaume between the French army of the north under Faidherbe, advancing for the relief of Paris, and a portion of the first Prussian army under Von Goeben. The French were repulsed, and on the next day fell back on Arras and Douai. The particulars of the battle became the subject of an animated controversy between Faidherbe and Von Goeben.

BAPHOMET, or **Baffomet,** a mysterious symbol used among the knights templar. The word was believed to be a corruption of Mahomet, to whose faith the templars were accused of inclining. According to more recent views, it had reference to Gnostic mysteries, and was connected with the Gnostic baptism, or baptism of fire. Some of these curious symbols were found in 1818 in the imperial museum of Vienna, and described by Von Hammer. They are of stone, and represent a female figure with two male faces, inscribed with a serpent, a truncated cross, or Egyptian key of life and death, the sun and moon, a chessboard, a candlestick with seven branches, and numerous Arabic inscriptions.

BAPTISM (Gr. *βάπτισμα*, from *βαπτίζειν*, frequentative of *βάπτειν*, to dip), the application of water as the sign of reception of a person into the visible Christian church. As to the mode, it is admitted by all orders of Christians that immersion is a valid form, while the Baptist denomination, with its various branches, maintain that this is the only valid form. The Latin church favors affusion three times applied, in the names of the three persons of the Trinity; it however admits of either immersion or sprinkling. The original rubric of the Greek church requires a trine immersion, but in the Russian branch sprinkling is held equally valid. The rubric of the church of England requires that an infant be dipped three times in water, unless the health of the child renders it unadvisable. Protestant denominations, other than Baptists, recognize either mode; among them immersion is rare, affusion not uncommon, but sprinkling more usual. In the Greek and Latin churches the rite is administered at a very early age, practically as soon as the physical condition of the recipient will permit. The proper time is generally held to be from a week to a month after birth; but when there is supposed to be danger of death, it may be administered at once. By many Protestant denominations who recognize the baptism of children, only those are to be baptized one or both of whose parents are members of the church. Baptists maintain that the rite can only be administered upon profession of faith by the recipient, and therefore only to those who have reached a sufficient age to make such profession intelligently. In the case of infants, the Greek, Roman, and Anglican churches require sponsors, who promise in the name of the child obedience to the divine law. In the Latin church sponsorship is held to constitute a kind of affinity, so that sponsors are not allowed to intermarry. In the Lutheran church the parents may be sponsors. In the dissenting bodies in England, and in most of the non-episcopal churches in the United States, sponsors are usually dispensed with. The Latin church recognizes as valid baptism performed by any person, even by a midwife, upon a new-born child; but except in peril of death, the minister should be a clergyman. Baptism is only to be administered once. Baptists immerse all new postulants. The Roman church recognizes all baptisms as valid, but administers to converts what is sometimes

styled "conditional baptism," in cases where there is any doubt as to the fact of the person having been before baptized.—The Latin church holds baptism to be a sacrament by which all previous offences, including the taint of original sin, are washed out, so that the person baptized stands free from all sin, whether actual or original, up to the time of baptism. Many Protestant denominations maintain that it is merely a ceremony of initiation into church membership. Between these two extremes lies every possible shade of sentiment. The general idea of different churches respecting the ordinance of baptism may be best expressed in the words of their own formularies. The idea of the Latin and Greek churches is clear: baptism is a washing out of all previous sin; the person baptized commences thenceforth a new life. Article xxvii. of the Anglican and of the American Episcopal church reads: "Baptism is not only a sign of profession and mark of difference whereby Christian men are discerned from others, but it is also a sign of regeneration, or new birth, whereby, as an instrument, they that receive baptism rightly are grafted into the church: the promises of the forgiveness of sin, and of our adoption to be the sons of God by the Holy Ghost, are visibly signed and sealed; faith is confirmed, and grace increased by virtue of prayer unto God. The baptism of young children is in any wise to be retained in the church as most agreeable with the institution of Christ." The Augsburg Confession says that baptism is "a necessary ordinance, a means of grace, and ought to be administered also to children, who are thereby dedicated to God and received into his favor." The Westminster Confession affirms that it is "a sacrament of the New Testament, ordained by Jesus Christ, not only for the solemn admission of the party baptized into the visible church, but also to be unto him a sign and seal of the covenant of grace, of his ingrafting into Christ, of regeneration, of remission of sins, and of his giving up unto God, through Jesus Christ, to walk in newness of life; which sacrament is, by Christ's own appointment, to be continued in his church until the end of the world. Not only those that do actually profess faith in and obedience to Christ, but also the infants of one or both believing parents, are to be baptized. Although it be a great sin to contemn or neglect this ordinance, yet grace and salvation are not so inseparably annexed unto it as that no person can be regenerated or saved without it, or that all that are baptized are undoubtedly regenerated." In article xvii. of the Methodist Episcopal church, it is declared that "baptism is not only a sign of profession, and mark of difference whereby Christians are distinguished from others that are not baptized, but it is also a sign of regeneration or the new birth. The baptism of young children is also to be retained in the church." The Baptist churches in America, being congregational in form, have no absolutely fixed formula. Two not very dissimilar ones are generally accepted, the "New Hampshire Confession of Faith" in the north, and the "Philadelphia Confession" in the south. The article on baptism in these two confessions is essentially the same, varying only in phraseology. In the Philadelphia Confession article xxii. reads: "Baptism is an ordinance of the New Testament, ordained by Jesus Christ to be unto the party baptized a sign of his fellowship with him in his death and resurrection; of his being ingrafted unto him; of remission of sins; and of his giving up unto God, through Jesus Christ, to live and walk in newness of life. Those who do actually profess repentance toward God, and obedience to our Lord Jesus Christ, are the only proper subjects of this ordinance. The outward element to be used in this ordinance is water, wherein the party is to be immersed in the name of the Father, and of the Son, and of the Holy Ghost."

BAPTISTERY (Gr. *βαπτιστήριον*), originally, a bathing place or swimming bath; later, and in ecclesiastical usage, a place set apart for performing the rite of baptism. At first the baptistery was an *exedra* or structure outside of the proper church; later the porch, and still later a part of the consecrated edifice, was so employed. As separate edifices, several baptisteries, notably those at Rome, Florence, and Pisa, are fine structures. The baptistery at Novara is one of the most curious buildings of this class, being largely composed of the remains of an ancient Roman temple, with an antique urn for a baptismal font. The introduction of the baptistery as a part of a church edifice dates from the 6th century. Ancient baptisteries were sometimes styled *φωτιστήρια*, either because baptism was considered as a *φωτισμός* or illumination, or because they were places where the catechumens were enlightened in the first

Baptistery at Novara.

principles of the Christian faith. Occasionally also we find *κολυμβήθρα*, bath, and *piscina*, fish pond, used as synonymes for baptistery. Baptistery is now commonly used to designate the baptismal font in Catholic and Episcopal churches, and the tank in which the rite of immersion is performed in Baptist churches, where convenient access cannot be had to a natural body of water. A baptistery in the latter sense may be either within or without the church edifice to which it pertains.

BAPTISTS, a denomination of evangelical Christians, who differ from others in respect to the proper age and mode of administering baptism. In the view of the Baptists age is nothing, but spiritual qualification is everything; hence they baptize all who repent and believe the gospel, whether in childhood, youth, or manhood, and very frequently whole households at once, as did the apostles. The Baptists reject the substitution of sprinkling for the entire immersion of the body, which they maintain was originally practised in the administration of baptism, and (except in the case of the sick) universally observed throughout Christendom for 1,800 years. For the universal obligation of immersion as identical with baptism itself, and essential to its specific spiritual purposes, they urge the admitted signification of the word *βαπτίζω*, the necessity of adhering to the ordinary meaning of words in the interpretation of laws, the places where the rite was originally performed, the phraseology employed in describing it, the example of Christ himself, and the metaphorical allusions of the sacred writers when explaining the spiritual import of the rite. They maintain that, so far as the meaning of the word is concerned, they have the concurrence of the whole body of the reformers of the 16th century, who were withheld from restoring immersion among Protestants generally, not by critical reasons, but by their views of church authority and expediency. The Mennonites, or Dutch Baptists, restored immersion; but a part of them, though still rejecting infant baptism, have since adopted pouring; those who retain immersion are now called Tunkers, *i. e.*, dippers. All the Greek and oriental churches, though adopting the baptism of children, retain immersion as essential to the validity of the rite, and deny that there is any efficacy in the western form of baptism.—On the subject of church communion strict Baptists agree generally with other denominations that it is not proper before baptism. Open communion, so eloquently advocated by Robert Hall in England, the Baptists of the United States regard as an anomaly. The Baptists believe in the spiritual unity of the whole believing church under Christ, its head, and in the duty of making this duty visible by subjection to him in all things. Local churches, like those of Jerusalem and Antioch, composed of converted members, duly baptized, embodied under the law of Christ by free mutual agreement, and maintaining the truth in love, they hold to be, according to the New Testament, the appointed means, in the first place, for manifesting this unity. The government of these churches is congregational. Each body, being immediately dependent on Christ, is therefore independent of all others, and is complete in itself for the management of its internal affairs, such as the choice of officers, declaration of faith, and reception, dismission, or discipline of members. Each church is a tribunal, where Christ himself presides, ratifying in heaven whatever is done according to his will on earth. This principle of independence is, however, balanced by the intercommunion of churches. This intercommunion is the highest form of visible unity, and is never to be interrupted without necessity. On this principle their churches associate, invite councils for advice, and organize societies for mutual coöperation in any benevolent, educational, or missionary enterprise. But all such associations among Baptists disclaim the slightest jurisdiction over the churches.—Baptists make no distinction but that of office between clergymen and laymen. The voice of the majority governs. They recognize no higher church officers than pastors and deacons. Elders, as evangelists and missionaries, are also ordained after due trial, and sent out to preach the gospel. Councils are usually called by the churches, to advise and assist in the ordination of ministers, the formation of churches, and the settlement of serious difficulties. Such councils in some localities are composed exclusively of ministers, and are called presbyteries; but they must not be confounded with the bodies that bear that name in the Presbyterian church, as they have neither judicial nor appellate powers. Whatever be their differences in other things, Baptists all agree in maintaining the congregational form of church government. With Congregationalists, so called, they differ only in regard to baptism and in being more strictly congregational.—In Great Britain the Baptists, next to the Congregationalists, form the most numerous body of Protestant dissenters. In England the body is divided by their views of the design of Christ's redemption into General and Particular Baptists, the former taking Arminian and the latter Calvinistic ground. The New Connection of General Baptists seceded from the old, to exclude Unitarianism, which was creeping in. They were originally strict communionists, but are now divided on that question. They have a theological school at Leicester, a successful mission at Orissa in India, and, though a small, are a zealous and flourishing body. The Particular Baptists are altogether the most numerous and influential. They have in Great Britain and Ireland 2,567 churches and 243,395 members. They have six theological colleges—at London, Bristol, Horton, Haverford West, Pontypool, and Edinburgh. Their periodical organs are the "Freeman," a large weekly sheet, and three monthly periodicals, the "Baptist Magazine," "Baptist Reporter," and the

"Eclectic Review." This body holds different views on the question of communion; the prevailing ones are those of Robert Hall. In all other respects they are united. Within half a century they have advanced rapidly in numbers and influence. They support the important mission to India begun by Carey in 1793, a Baptist home mission, and missions in Ireland, France, Africa, Honduras, and the West Indies. The Jamaica mission is now self-supporting, but the home society has established and sustains at Calabar, in Jamaica, a theological institution for native candidates for the ministry, which is in a flourishing condition, and promises much for Africa also. Baptist principles are spreading rapidly in all the widely extended colonies of Great Britain, particularly Australia, New Zealand, St. Helena, New Brunswick, Nova Scotia, and the Canadas. On the continent of Europe, within 35 years, nearly 30,000 converts have been baptized, and 100 churches planted in the principal cities of France, Switzerland, Germany, and Denmark, besides 220 churches in Sweden, with 8,807 members. Many of these converts have suffered severe fines and imprisonments; some have been denied the liberty of marriage; others have had their children forcibly baptized in the state church; others, still, have been condemned to perpetual banishment. But in the face of all this intolerance they have advanced. Hundreds, driven from their homes, emigrate to America. Recent information from France and Switzerland announces the gradual abandonment of infant baptism by the free evangelical churches, and also by some in the Protestant national church. — In the United States the Baptist, with one exception, is now the largest denomination of evangelical Christians. They are spread through every state and territory. Owing to a difference on the subject of slavery, in 1845 the southern Baptists, by mutual consent, formed separate organizations for their benevolent enterprises. As early as 1764, when numbering in all America only 60 churches and about 5,000 members, the Baptists founded their first college in Rhode Island. Long before, they had fostered Harvard, and helped Franklin to lay the foundations of the university of Pennsylvania. They now have 28 colleges of their own, over 100 academies and female seminaries of a high grade, and 9 theological schools. They have publication societies at Philadelphia, Charleston, and Nashville, besides many flourishing private publishing houses in our large cities. They maintain 45 periodical organs, including a quarterly review. The Baptists of the United States also support the American and foreign Bible society, the American Baptist missionary union, the southern Baptist board of foreign and domestic missions, the Baptist home mission society, and in part the "American Bible Union." Their missions are planted in Canada, Oregon, California, New Mexico, Hayti; in France, Spain, Germany, Denmark, Sweden, Norway; in western and central Africa; in southern India, Assam, Burmah, Siam, and China. The number of conversions from their colportages and missions in 1871 exceeded 5,000. Total number in the mission churches, over 50,000. The income of all the above societies in 1871 was $800,000. In doctrine the Baptists of this country are Calvinistic, but with much freedom and moderation. The New Hampshire declaration of faith in 1833 is the most popular.—Besides the general body of Baptists, there are in the United States nine smaller bodies, distinguished by peculiarities indicated by their respective names. The Seventh-Day Baptists differ only in the observance of the Jewish Sabbath; the Free-will and the Anti-mission Baptists are seceders from the general fellowship on account of Arminian and Antinomian tendencies, though the latter are gradually adopting different views and returning to the general body. The General (or Six-Principle) Baptists, the Tunkers, and the Mennonites are of foreign origin, and cling to their ancient usages. The Christian connection, the Campbellites (or Disciples), and the Winebrennarians (or Church of God) are new organizations, drawn from various sources, though agreeing with the Baptists generally as to the subjects and mode of baptism. For the peculiarities of each see the respective articles.—It is asserted by some Baptists that they can trace their history in a succession of pure churches (*cathari*) essentially Baptist, though under various names, from the 3d century down to the reformation. These churches, from the 5th century onward, were the subjects of systematic persecution from the state churches, both in the East and in the West. Cyril of Alexandria and Innocent I. of Rome, according to the historian Socrates, began this persecution by depriving them of their houses of worship, and driving them into secret places, under the laws of Honorius and Theodosius II., which forbid rebaptism (so called) under penalty of death. Yet their principles reappear among the Culdees of the West and the Paulians of the East, the Vallesii and the Paterines, the Albigenses and Waldenses, and emerge on all sides at the first dawn of the reformation. Mr. Bancroft says of the German Baptists of that era: "With greater consistency than Luther they applied the doctrines of the reformation to the social positions of life, and threatened an end to priestcraft and kingcraft, spiritual domination, titles, and vassalage. They were trodden under foot with foul reproaches and most arrogant scorn, and their history is written in the blood of thousands of the German peasantry; but their principles, secure in their immortality, escaped with Roger Williams to Providence, and his colony is witness that naturally the paths of the Baptists are paths of freedom, pleasantness, and peace." (See ANABAPTISTS.)—In England, from the time of Henry VIII. to William III., a full century and a half, the Baptists struggled to gain their footing,

and to secure liberty of conscience for all. From 1611 they issued appeal after appeal, addressed to the king, the parliament, and the people, in behalf of this "soul liberty," written with a breadth of view and force of argument hardly since exceeded. Yet, until the Quakers arose in 1660, the Baptists stood alone in its defence, amid universal opposition. In the time of Cromwell they first gained a fair hearing, and, under the lead of Milton and Vane, would have changed the whole system of the church and the state but for the treason of Monk. In the time of Charles II. the prisons were filled with their confessors and martyrs, yet their principles gradually gained ground in the public mind and hastened the revolution of 1688. "The share which the Baptists took," says Dr. Williams, "in shoring up the fallen liberties of England, and in infusing new vigor and liberality into the constitution of that country, is not generally known. Yet to this body English liberty owes a debt it can never acknowledge. Among the Baptists Christian freedom found its earliest, its stanchest, its most consistent, and its most disinterested champions." Not less powerful has been the influence of the Baptists in the United States. Introduced into Rhode Island with Roger Williams and John Clark in 1638, their history for more than a century, in most of the colonies, is that of proscribed and banished men. Yet, persecuted themselves, they never persecuted others. "In the code of laws established by them in Rhode Island," says Judge Story, "we read, for the first time since Christianity ascended the throne of the Cæsars, the declaration that conscience should be free, and men should not be punished for worshipping God in the way they were persuaded he requires." The article on religious liberty in the amendments to the American constitution was introduced by the united efforts of the Baptists in 1789. The new impulse given to the spirit of liberty by the revolutionary war was followed by the rapid spread of Baptist principles. Their great prosperity dates from that era. In 1762 there were 56 Baptist churches in America; in 1792 there were 1,000; in 1812, 2,433; in 1832, 5,322; in 1852 they exceeded 9,500. At the present time, according to the "Baptist Year Book" for 1872, without including any of the Baptist minor bodies, there are 18,397 churches, 12,013 ministers, and 1,489,181 church members, of whom 85,321 were added the preceding year. Including those of the British provinces, the total number of members was 1,557,449. If those sects be included which agree with the Baptists in their organic principles, though differing in other points, the number would rise to more than 1,700,000. The total population attached to Baptist views is estimated at nearly 8,000,000. From these statistics it appears that the increase of the Baptists far outruns that of the population of the United States. The rates of increase have been greatest in Massachusetts and Virginia, where they were most persecuted, and in the new states where their zealous ministers were among the earliest pioneers. (See Curtis's "Progress of Baptist Principles for the last One Hundred Years," Boston, 1856.)

BAR. See Bar-le-Duc, Bar-sur-Aube, and Bar-sur-Seine.

BAR, a town of S. W. Russia, government of Podolia, on the Rov, 53 m. N. E. of Kamenetz; pop. in 1867, 8,077. It is famous as the place where a confederation of Polish patriots was formed, chiefly under the lead of the Pulaskis, with a view to combating Russian influence and the adherents of Russia in Poland, Feb. 29, 1768. The Russians took Bar by storm on the following May 28, together with 1,400 men and 20 pieces of cannon.

BAR. I. An enclosure made by a railing or partition for the use of counsel in courts, and to prevent their being incommoded by spectators; from whence is sometimes supposed to have come the term barrister, applied to those called within the bar. At this bar prisoners were placed for trial. The term is used collectively to designate those who as counsel are entitled to address the court. **II.** A low partition which in the houses of parliament and legislative halls generally separates from the body of the house a space near the door, beyond which none but members, clerks, and messengers are admitted except on leave. Persons charged with contempt are brought to the bar of the house; and at the opening and close of a session of parliament the commons go to the bar of the house of lords to hear the queen's speech.

BARABA, a steppe of Siberia, 300 m. from E. to W. and 450 from N. to S., comprising the S. E. part of the province of Tobolsk, and the S. W. portions of Tomsk. The Altai mountains enclose it on the south, and the Irtish and Obi rivers on the west and east. Certain districts are fertile, and there are extensive forests; but the whole region abounds in swamps and salt lakes, the waters of which become poisonous during the summer. The inhabitants consist of Russian colonists living in villages, and of Barabintzi, a small tribe of Tartar origin, who are chiefly nomadic shepherds or fishermen.

BARACOA, a seaport town of Cuba, in the Eastern Department, capital of a district of the same name, on the N. E. coast, 100 m. E. of Santiago de Cuba; pop. about 5,500. It is on the E. side of a small but deep harbor, on a rocky bluff of coral formation; and back of the town are high, craggy mountains of curious shape, the highest of which is called the Anvil of Baracoa. The houses are well built of adobe and surrounded with fine gardens. An unusually large quantity of rain falls at Baracoa, and the forests and large orchards of cocoanut palms in the vicinity are very luxuriant. It is the centre of a large fruit trade with the United States; limes, oranges, lemons, pineapples, and cocoanuts are brought in from the surrounding country on mules and donkeys. The trade in

cocoanuts is said to average 50,000 a day. Cigars only are manufactured. Columbus landed here, and the first settlement on the island was made here in 1512 by Diego Velazquez.

BARADA, a river of Syria, probably the Biblical Abana, called by the Greeks the Chrysorrhoas or Bardines. It rises in the Anti-Libanus, flows S. E., and falls into the Bahret-el-Kibliyeh, a lake or swamp, E. of Damascus. Issuing from a cleft in the mountains as a clear rapid stream, it divides into three smaller courses. The central or main stream runs straight to the city of Damascus, supplying the baths and fountains of that city. The other branches diverge to the right and left, and, after irrigating the plain, reunite with the main stream. The water of the Barada, like that of the Jordan, is of a white sulphurous hue, and has an unpleasant taste.

BARAGA, Frederick, D. D., a Roman Catholic bishop and missionary among the North American Indians, born at Treffen, Carniola, June 29, 1797, died at Sault Ste. Marie, Jan. 19, 1868. He was of a noble family, was educated at the university of Vienna, was ordained a priest in September, 1823, came to America in December, 1830, and from that time till his death was connected with the Chippewa and Ottawa missions in Michigan. He was consecrated bishop of Marquette and Sault Ste. Marie in 1853. He was the author of a Chippewa grammar and dictionary (Detroit, 1849 and 1852), of several religious works in Chippewa, and of a small work in German on the "History, Character, and Habits of the North American Indians" (1837).

BARAGUEY D'HILLIERS. I. Louis, a French general, born in Paris, Aug. 13, 1764, died in Berlin in December, 1812. At the beginning of the French revolution he was lieutenant in the regiment of Alsace, was appointed brigadier general in 1793, and chosen by Custine as the head of his staff. His fidelity to that unfortunate chief led to his imprisonment, but he was liberated after the 9th Thermidor. He served under Napoleon during his first two campaigns in Italy, and was promoted to the rank of division general. He distinguished himself at Stuttgart and Elchingen and on the frontiers of Bohemia, was governor of Friuli in 1806, of Venice in 1808, and participated in the victory of Raab won by Eugène Beauharnais over the Austrians in June, 1809. During the following two years he served in Spain. In 1812 he was put in command of a division of the grand army against Russia, and was captured with nearly all his forces by the enemy. A court of inquiry was ordered by Napoleon, at which he was so aggrieved that he fell sick and died before he reached France. **II. Achille,** marshal of France, son of the preceding, born Sept. 6, 1795. He served as second lieutenant during the Russian campaign, became in 1813 aide-de-camp to Marshal Marmont, and at the battle of Leipsic had his left hand carried away by a cannon ball. He was a captain on the fall of the empire, though not yet 20 years old. Adhering to the restored Bourbons, he entered the royal guards, served in Spain and Algeria, became second in command at the military school of St. Cyr in 1832, and afterward principal, a position which he held till 1840. For some years thereafter he served with some distinction in Algeria and became a general. Returning to France in 1847, he was appointed inspector general of infantry. After the outbreak of the revolution of 1848, he was appointed chief of the second division of the army near the Alps. He was elected to the constituent assembly from the department of Doubs, and joined the party of reaction. In 1849 he went to Rome as commander-in-chief of the army sent to sustain the authority of the pope, and in 1851 was put in command of the army of Paris in place of Gen. Changarnier, whom Napoleon distrusted. He favored the *coup d'état*, and was made a member of the consultative commission. In the Crimean war he commanded the expedition to the Baltic, and on his return was made a marshal and became one of the vice presidents of the senate. He commanded the first army corps in the Italian campaign of 1859, and took a prominent part in the battle of Solferino. In 1863 he was in command of the camp at Châlons, and shortly after the outbreak of the war of 1870 was for a few days military governor of Paris.

BARANOFF, Nikolai, a deaf-mute Russian painter, born in Esthonia in 1810. He studied in Berlin at the expense of the czar, and has produced genre and historical pictures.

BARANOFF, Alexander Andreyevitch, governor of the Russian possessions in North America, born in 1746, died at sea, near the island of Java, April 28, 1819. Early in life he was engaged in commerce in western Siberia, but in 1790 established himself at Kadiak, and opened a trade with the natives. In 1796 he founded a commercial colony on Behring strait, and in 1799 took possession of the largest of the Sitka group of islands, now known by his name. He built a large factory at Sitka, and opened commercial relations with Canton, Manila, Boston, New York, California, and the Sandwich Islands, founded a colony near San Francisco, and was ennobled by the czar Alexander and made first governor of Russian America. He died while returning to Russia.

BARANTE, Amable Guillaume Prosper, baron de Brugière, a French statesman and historian, born at Riom in Auvergne, June 10, 1782, died in Auvergne in 1866. He was educated at the polytechnic school in Paris, and occupied during the empire several offices at home and missions abroad. He was prefect of Loire-Inférieure on the fall of Napoleon, kept his post under the restoration, and after the hundred days became a member of the council of state and general secretary of the home department. In 1819 he was made a peer of France, and after that most of his time was given to lit-

erary pursuits. As early as 1809 he had published anonymously his *Tableau de la littérature française au* 18e *siècle*, and he was the real author of a great part of Mme. de la Rochejaquelin's *Mémoires* on the war in La Vendée. He published a French version of Schiller's dramas (1821), contributed to the *Collection des théâtres étrangers*, and furnished the "Hamlet" of Guizot's translation of Shakespeare. His *Histoire des ducs de Bourgogne de la maison de Valois* (3 vols. 8vo, 1824–'6), a skilful arrangement of the memoirs of old chroniclers, has been considered a model of purely narrative history, and secured his election to the French academy. After the revolution of 1830 he was appointed ambassador to Turin, and in 1835 he went as minister to St. Petersburg. After the revolution of 1848 he devoted himself wholly to literary pursuits. Among his remaining works are: *Mélanges historiques et littéraires* (3 vols., 1836); *Questions constitutionnelles* (1850); *Histoire de la convention nationale* (6 vols., 1851–'3); *Histoire du directoire* (3 vols., 1855); *Études historiques et biographiques* (2 vols., 1857); *La vie politique de M. Royer-Collard* (2 vols., 1861); and *De la décentralisation en* 1829 *et en* 1833 (1865). As a historian Barante was impartial and accurate in his statements.

BARANYA, a county of S. W. Hungary, bounded by the Danube, which there forms Margitta island, and the Drave, which separates it from Slavonia; area, about 1,965 sq. m.; pop. in 1870, 283,506, of whom more than half are Magyars, and the rest chiefly Germans, Croats, and Serbs. The surface is partly hilly and partly level, and the soil almost everywhere very fertile, producing wheat, tobacco, fruits, and excellent wines. The county is also rich in cattle, sheep, and swine. There are several mineral springs. The most important towns are Fünfkirchen or Pécs, the capital, and Mohács, near which in 1526 Hungary lost her army, her king, and her independence.

BARATIER, Johann Philipp, a precocious German scholar, born at Schwabach, near Nuremberg, Jan. 19, 1721, died in Halle Oct. 5, 1740. He was the son of a Protestant pastor, who had fled from France on the revocation of the edict of Nantes. Before his 5th year he had learned to read and write French, German, and Latin, and he afterward mastered, almost unaided, Greek, Hebrew, Syriac, Arabic, and Ethiopic. In his 9th year he made a dictionary of difficult Hebrew and Chaldaic words, and in his 13th year published a translation from the Hebrew of the itinerary of Benjamin of Tudela, to which he added notes and historical dissertations. He also published several learned theological pamphlets, and made difficult mathematical and astronomical calculations. In his 14th year he received from the university of Halle the degree of master of arts, on which occasion he defended 14 theses in the presence of more than 2,000 spectators. The royal society of sciences at Berlin made him a member, and the king of Prussia made him an annual allowance of $50, presented him with books and mathematical instruments, and gave to his father a living at Halle. He began a history of the church, a history of the 30 years' war, and various other works.

BARATYNSKI, Yevgeni Abramovitch, a Russian poet, died in Italy in September, 1844. He was educated at St. Petersburg, served eight years as a soldier in Finland, and afterward lived in Moscow. "Eda," the first offspring of his muse, is a spirited poem, with strong local coloring and Finnish characteristics. His most agreeable production is the "Gypsy," a graceful picture of the best features of Russian high life.

BARB, a fine breed of horses cultivated by the Moors of Barbary, and first introduced by them into Spain. They are believed to have been of a kindred origin with the Arabian horse, but are less remarkable for beauty and symmetry than for speed, endurance, and docility. They are generally larger than the Arabian, and the black barbs of Dongola are said to be rarely less than 16 hands high. The wild horses of America are believed to have descended from Spanish barbs, brought over by the early explorers.

BARBADOES, or **Barbados,** a British island of the West Indies, the most easterly of the Caribbean group, in lat. 13° 10′ N., lon. 59° 32′ W. It is of an oval form, 22 m. long and 14 broad; area, 166 sq. m.; pop. in 1861, 152,727, being 920 to the square mile. The population of Barbadoes is denser than that of any other country in the world except Malta. In 1861 there were 16,594 white, 36,118 of mixed race, and 100,005 black. The island is divided by a deep valley into two parts. Near the centre of the northern and larger part is Mount Hillaby, 1,147 ft. high. From the W. coast the ground rises in successive terraces, broken by ravines to the central ridge, from which hills of a conical form radiate in a N. E. direction to the seashore. The N. W. and S. parts of the island consist of rocks of coralline limestone with beds of calcareous marl; the E. part is composed of strata of silicious sandstone, intermixed with ferruginous matter, clay, marl, minute fragments of pumice, strata of volcanic ashes, seams of bitumen, and springs of petroleum. There are several chalybeate springs, containing chiefly iron, carbonic acid, and fixed alkali, in different proportions. The island is encircled by coral reefs, which in some parts extend seaward for three miles, and are dangerous to navigation. Carlisle bay, the port and harbor of Barbadoes, is a spacious open roadstead, capable of containing 500 vessels; but it is exposed to S. and S. W. winds. The climate, though warm, is salubrious. The island is greatly exposed to hurricanes. One of these, in October, 1780, destroyed almost every building, and 3,000 or 4,000 lives. During another in August, 1831, the loss of life is

Barbadoes.

stated to have been from 2,000 to 5,000, and the destruction of property £1,602,800. The principal articles of export are sugar, cotton, aloes, and arrowroot; the imports are chiefly fish, beef, flour, cutlery, and cloths. In 1850 the imports were £734,358, exports £831,534; in 1860, imports £976,300, exports £1,345,400; in 1870, imports £1,026,221, exports £935,425. There are only four towns, of which Bridgetown, the capital, has about 25,000 inhabitants. The government consists of a governor, council, and house of assembly. The governor, appointed by the crown, is also governor general of the neighboring islands of Grenada, St. Vincent, Tobago, Trinidad, and St. Lucia. The council consists of 12 members, appointed by the crown, who hold office during the royal pleasure. The assembly consists of 24 delegates, elected annually by the people.—Barbadoes was probably discovered early in the 16th century by the Portuguese. When it was first visited by the English in 1605, it was uninhabited and covered with dense forests. The first English colony, consisting of 40 whites and 7 negroes, was founded in 1625. In 1665 the Dutch made a fruitless attempt to seize the island. In 1676, 1692, 1816, and 1825, plots were formed among the negroes to take possession. In 1788 the population was 16,127 whites, 2,229 free colored, and 64,405 negroes. There appears to have been no increase in the white population for 75 years, while the colored or mixed portion has multiplied 15 fold. The abolition of slavery in 1834 was effected without disorder.

BARBARA, Saint, a virgin and martyr, honored in the Greek and Roman Catholic churches, and supposed to have suffered at Heliopolis in 306, or at Nicomedia in Bithynia in 235. According to the *Aurea Legenda*, she was born at Heliopolis in Egypt, of pagan parents; and her father, fearing she should be taken from him on account of her great beauty, confined her in a tower. In her seclusion she heard of the preaching of Origen, and wrote to him begging for instruction, whereupon he sent one of his disciples, who taught and baptized her. On learning this her father put her to death, and is said to have been immediately struck by lightning; for which reason the saint has been regarded as the patron of sailors in a storm, and of artillerymen. In art she is generally represented with a tower. Her festival day is Dec. 4.

BARBARELLI, Giorgio. See GIORGIONE.

BARBAROSSA, the name given to two renegade Greek corsairs, and supposed to be a corruption of *Baba-rais*, father captain. **I. Arudj, Horush,** or **Horuk,** born at Mitylene (Lesbos) about 1474, executed in 1518. He acquired fame in the service of Egypt, Turkey, and Tunis, and with his brother became the terror of the Mediterranean. Invited by the emir of the Metidja, Selim Eutemi, in 1516, to aid him against the Spaniards, he made himself master of Algiers, Tenez, and Tlemcen, and murdered the emir, but was defeated by the troops of Charles V., besieged in Tlemcen, captured on his flight from that city, and put to death. **II. Khair-ed-Din,** brother and successor of the preceding, born about 1476, died in Constantinople in 1546. After his brother's death he obtained the assistance of the sultan Selim I. in recovering Algiers. Solyman I. putting him in command of his fleet, he fortified Algiers, and conquered Tunis and other territories for the Turks. After Charles V. retook Tunis in 1535, Barbarossa preyed upon the coast of

Italy, defeated Doria in the gulf of Ambracia, captured Castel Nuovo (1539), defeated a Christian squadron off Candia, threatened Doria at Genoa, joined Francis I. against Charles V., aided the French in taking Nice (1543), and made a triumphant entry into Constantinople with many thousand prisoners.

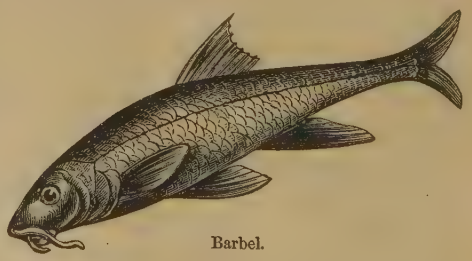
BARBAROSSA, Frederick. See FREDERICK I., emperor of Germany.

BARBAROUX, Charles Jean Marie, a French revolutionist, born in Marseilles, March 6, 1767, guillotined at Bordeaux, June 25, 1794. He was a prominent young lawyer when in 1791 he was sent by his native city as revolutionary agent to the legislative assembly and was admitted to the Jacobin club. When it was feared that the court would succeed in arresting the revolutionary movement in the north of France, Barbaroux was vehement in supporting the plan of a separate republic in the south. He took, with his 500 countrymen, who were especially called *les Marseillais*, an important part in the insurrection of August 10, 1792, which led to the downfall of the monarchy. Elected a deputy to the convention, he joined the deputies of the Gironde, became by his zeal, eloquence, and rare personal beauty a conspicuous member of their party, opposed the merciless policy of Marat and Robespierre, and demanded an act of accusation against the promoters of the massacre of September. He manifested remarkable ability in the discussion of questions of finance, commerce, and the internal administration of the country; he strongly opposed several of the rash and unjust financial measures of the day, and suggested several plans for a more prudent management. At the trial of Louis XVI. he voted for the king's death, but favored an appeal to the nation. After the popular rising of May 31, 1793, which sealed the tragic fate of the Girondists, Barbaroux left Paris with some of his colleagues, and tried to raise an insurrection in the provinces against the convention; but this movement was soon suppressed, and Barbaroux, hunted from place to place, sought a refuge in the vicinity of Bordeaux. Being discovered, he shot himself twice; but though in a dying condition, he retained life enough to be sent to the scaffold by the revolutionary committee of Bordeaux.

BARBARY STATES, a general term designating that portion of northern Africa stretching from the W. frontier of Egypt to the Atlantic, and from the Mediterranean to the desert of Sahara, between lat. 25° and 37° N., lon. 10° W. and 25° E., and including Tripoli, Tunis, Algeria, and Morocco. The name is derived from the Berbers, the ancient inhabitants of the region, who still constitute a considerable portion of the population.

BARBASTRO, a town of Catalonia, Spain, on the Cinca, in the province and 26 m. S. E. of Huesca; pop. about 6,500. It is an old town, and has a fine cathedral with good mediæval paintings, and an important school.

BARBAULD, Anna Lætitia, an English writer, born at Kibworth-Harcourt, Leicestershire, June 20, 1743, died at Stoke-Newington, near London, March 9, 1825. She displayed unusual talent as a child, and her early education was directed with care by her father, the Rev. John Aikin, a Unitarian minister. At the age of 15 she removed with him to Warrington in Lancashire, where he took charge of the academy, out of which grew the central Unitarian college, afterward transferred to York, and finally established in Manchester. In 1773, at the age of 30, she published a volume of her poems, which the same year ran through four editions. This was followed by "Miscellaneous Pieces in Prose," partly written by her brother John Aikin. In 1774 she married the Rev. Rochemont Barbauld, with whom she kept a school for the next 11 years in the village of Palgrave, Suffolk. During this period she published "Devotional Pieces, compiled from the Psalms of David," "Early Lessons for Children," and "Hymns in Prose for Children." After a short visit to the continent in 1785–'6, Mrs. Barbauld went to live at Hampstead, near London, where her husband became pastor of a small congregation, and she took charge of a few pupils. Here she wrote several pamphlets and poems on popular subjects, such as the removal of the civil disabilities of the dissenters and the abolition of the slave trade, and various contributions to her brother's "Evenings at Home." In 1802 she removed with her husband to Stoke-Newington, and there passed the rest of her life. Here she prepared "Selections from the Spectator, Guardian, Tatler, and Freeholder," with a preliminary essay. She wrote the life of Richardson, the novelist, to accompany his correspondence, edited Akenside's "Pleasures of the Imagination" and Collins's "Odes," and a collection of the "British Novelists," with memoirs and criticisms, and published "The Female Spectator," a miscellany of prose and verse. Her last separate publication, "Eighteen Hundred and Eleven" (1812), is her longest and most highly finished poem. Her works, in two volumes, were edited, with a memoir, by her niece, Miss Lucy Aikin. Her writings are distinguished for their pure moral tone, simplicity, and earnestness, and her books for children are among the best of their class.



Barbel.

BARBEL (*barbus*, Cuv.), a large, coarse freshwater fish, of the family *cyprinidæ*, found in

many of the large European rivers. It has several barbs or beard-like feelers pendent from its leathery mouth, which are said to be the origin of its name. It frequents deep, still pools with eddies, in swift-flowing streams; roots in the gravel bottoms like a hog; and feeds on worms and other bottom bait. It grows to the length of 3 feet and to the weight of 18 or 20 pounds, is a determined biter, and, when hooked, a desperate puller. It is of little value as food.

BARBÉ-MARBOIS, François de, count and marquis, a French statesman, born at Metz, Jan. 31, 1745, died Jan. 14, 1837. After filling diplomatic offices at several German courts, he was sent to the new government of the United States of America as consul general of France. He organized all the French consulates in this country, and during his residence here married the daughter of William Moore, governor of Pennsylvania. In 1785 he was appointed by Louis XVI. intendant of St. Domingo, and introduced many reforms in the administration of justice and of finance. He returned to France in 1790, and, having vindicated himself from various accusations, was again employed in German diplomacy. In 1795 he was elected a member of the council of elders, but was soon charged with a variety of offences, and, though he defended himself with spirit, was in 1797 exiled to Guiana as a friend of royalty. He was recalled in 1801 and made director of the treasury, a title which he soon exchanged for that of minister of finance. In 1803 he was authorized to cede Louisiana to the United States for 50,000,000 fr., but had the skill to obtain 75,000,000 fr., a piece of diplomacy for which he was liberally rewarded by Napoleon. He was soon after made count of the empire and chief officer of the legion of honor. In 1806 a sudden decline in the funds caused by a blunder in his administration brought about his disgrace, which was however speedily ended by Napoleon, who recognized and needed his ability. In 1813 he entered the senate, and the next year voted for the deposition of the emperor and the reëstablishment of the Bourbon dynasty. He was well received by Louis XVIII., appointed a peer of France and honorary counsellor of the university, and confirmed in the office of first president of the court of accounts, which he had formerly held. Napoleon after his return from Elba ordered him to leave Paris. He resumed his offices on the return of the Bourbons. After the revolution of July he took the oath of fidelity to Louis Philippe. He wrote *Réflexions sur la colonie de Saint-Domingue* (1796); *Complot d'Arnold et de Sir Henry Clinton contre les États-Unis d'Amérique et contre le Général Washington* (Paris, 1816); *De la Guyane* (1822); *Lettres de Madame la Marquise de Pompadour*, with a memoir (1811); *Histoire de la Louisiane et de la cession de cette colonie par la France aux États-Unis* (1828); and various other works.

BARBER, Francis, the negro servant and friend of Dr. Samuel Johnson, born in Jamaica, probably about 1741, died Feb. 13, 1801. He was taken to England in 1750, and sent to a boarding school in Yorkshire. In 1752 he entered Dr. Johnson's service, in which he continued till Johnson's death, with the exception of two intervals: in one of which, upon some difference with his master, he served an apothecary in Cheapside; and in another he took a fancy to go to sea. This last escapade occurred in 1759, and through Dr. Smollett's interference with John Wilkes, one of the lords of the admiralty, procured his discharge (in June, 1760), without any wish on the part of Barber. On returning, he resumed his situation with Dr. Johnson, who sent him to school for a time. It was owing to Barber's care that the manuscript of Johnson's diary of his tour in Wales in 1774 was preserved. Dr. Johnson gave Barber in his will an annuity of £70, and after the payment of a few legacies made him residuary legatee. Barber's whole income from this bequest amounted to about £140, on which, at Johnson's recommendation, he retired to Lichfield, and passed the rest of his days in comfort.

BARBER, Francis, an officer in the American revolution, born at Princeton, N. J., in 1751, died at Newburgh, N. Y., in April, 1783. He graduated at the college of New Jersey in 1767, and in 1769 became rector of the academy at Elizabethtown, N. J. He gained a very high reputation as a teacher, and had among his pupils Alexander Hamilton. At the commencement of the war he enlisted with his two younger brothers. In February, 1776, he received a commission as major of the 3d battalion of the New Jersey troops, in November of the same year was appointed lieutenant colonel of the 3d Jersey regiment, and in 1777 was named assistant inspector general under Baron Steuben. He served with his regiment under Gen. Schuyler in the northern army, and participated in the battles of Trenton, Princeton, Brandywine, Germantown, and Monmouth. In the last-mentioned action he was severely wounded, and compelled to retire to his home at Elizabethtown. There he made himself useful in obtaining intelligence of the enemy's movements. In 1779 he served as adjutant general in Gen. Sullivan's campaign against the Indians, and was wounded in the battle at Newtown. He was engaged in the battle of Springfield, and in 1781, when the mutiny of the Pennsylvania and New Jersey troops broke out, he was selected by Washington to suppress the revolt. He was present at the battle of Yorktown, and at the close of the war was with the army at Newburgh. On the day that he was invited by Washington to be present at a dinner to hear the news of the peace he was killed by a falling tree.

BARBERINI, an Italian family of Tuscany, who settled in Florence in the 11th century, and acquired wealth by trade in the 16th, and

historical importance early in the 17th century by the elevation of MAFFEO BARBERINI to the papacy under the name of Urban VIII. His brother ANTONIO became cardinal, and his brother CARLO general of the papal troops; and the three sons of the latter exercised a vast influence, especially TADDEO, who succeeded his father as general of the papal troops, and married Anna Colonna. He acquired Palestrina and other fiefs, and became prefect of Rome in 1631 after the death of the duke of Urbino and the addition of the dukedom to the papal possessions. Other leading Italian houses, especially the Farnese, took umbrage at the increasing power of the Barberini, which led to the Castro war (1641–'4) for the possession of Castro and Ronciglione, Odoardo Farnese, duke of Parma, declaring that he was waging war against the Barberini, and not against the pope. Urban VIII. died in 1644, and though the election of his successor Innocent X. was due to the Barberini influence, one of the first measures of the new pope was to institute proceedings against them, and especially against Taddeo for financial mismanagement. Taddeo fled to Paris, where he died in 1647.—FRANCESCO, brother of the preceding, born in 1597, died in 1679. He became cardinal and vice chancellor, obtained great influence in the administration, and founded with the aid of Leo Allazzi, a Greek scholar, the Barberini library. He, too, had to leave Rome after the accession of Innocent X., but was permitted to return, and became dean of the sacred college.—ANTONIO, brother of the preceding, cardinal and high chamberlain under Urban VIII., born in 1608, died in 1671. He held high ecclesiastical offices in France through the favor of Mazarin, but returned to Italy after his reconciliation with the new pope.—Over 100,000,000 scudi passed into the hands of the Barberini family during their tenure of power. The Barberini palace, one of the largest in Rome, still attests their sumptuous and artistic tastes, and the library continues to be renowned for its valuable MSS.—The present head of the Barberini-Colonna family is ENRICO, prince of Palestrina, born March 26, 1823, who married in 1853 the princess Teresa Orsini.

BARBERRY (*berberis*), a genus of plants of the natural order *berberidaceæ*, whose characteristics are: 6 roundish sepals, with bractlets outside; 6 obovate petals, with 2 glandular spots inside; 6 stamens; alternate, ovate, serrated, and pointed leaves; a shrubby habit, with yellow wood and inner bark; yellow flowers in drooping racemes; and sour berries and leaves. The stamens have a remarkable irritability, so that when the filament is touched on the inside with the point of a needle, they throw themselves quickly forward upon the stigma; the petals also follow them in this movement. This phenomenon is best observed in mild and dry weather, and can rarely be seen after the stamens have been dashed against each other by a violent wind or rain. The genus comprises about 50 species, which are found in various regions from China to Mexico; several of them are evergreens, and most of them are ornamental as well as useful. *B. vulgaris*, or common barberry, has thorns upon the branches, obovate-oblong, bristly toothed leaves in rosettes or fascicles, drooping many-flowered racemes, and scarlet oblong berries. It is a native of the northern parts of Europe and Asia, but has become naturalized and thoroughly wild in the thickets and waste grounds of eastern New England. In the north of Europe it prefers the valleys, but in the south it grows on mountains, and is one of the most hardy of Alpine shrubs. In Italy it attains a height of from 4 to 6 ft., and lives for centuries. *B. Canadensis*, or American barberry, is a shrub from 1 to 3 ft. high, with leaves less sharply pointed and racemes with fewer flowers than the preceding, and is found on the Alleghanies of Virginia and southward. *B. aquifolium*, a native of western North America, has shining evergreen pinnated leaves,

Barberry (Berberis vulgaris).

and deep violet or red berries, and is often cultivated for its beauty. There are several other Asiatic and American species which are among the most hardy ornaments of gardens.—Nearly all the parts of this plant serve a useful purpose. The inner bark and the root, with the aid of alum, furnish an excellent yellow dye for coloring linen and leather. Its leaves are cropped by cows and sheep. It is probably by reason of its yellow color that it has been esteemed good for the jaundice, the same having been fancied also of the dock and carrot; but the bitterness and astringency of the bark have made it valued as a medicine. The berries are so acid that birds refuse to eat them; but when prepared with sugar, they make delicious and healthful preserves, sirups, and comfits. It has been a very general opinion that barberry bushes cause blight to wheat sown in their vi-

cinity; but if this be true, it has not been accounted for.

BARBÈS, Armand, a French revolutionist, born at Pointe-à-Pitre, Guadeloupe, Sept. 18, 1809, died at the Hague, June 26, 1870. He went to southern France as an infant, and was educated for the bar. On the death of his father, who left him a large fortune, he went to Paris (1830), where he soon became conspicuous as a member of secret political societies. He was imprisoned for several months in 1834 on charges which were not substantiated. In 1835 he was arrested on suspicion of complicity in Fieschi's attempt at regicide, and soon afterward sentenced to a year's imprisonment for secretly making gunpowder. In 1839 he was sentenced to death as ringleader of an insurrection which resulted in the murder of Lieut. Drouineau; but his life was spared, and during his imprisonment he wrote *Deux jours de condamnation à mort* (Paris, 1848; 2d ed., with a letter of Louis Blanc). He recovered his liberty after the revolution of 1848, and was elected to the constituent assembly. For a new attempt at insurrection in May of that year, with Hubert, Raspail, and Blanqui, he was sentenced to perpetual imprisonment at Belle-Isle-en-Mer. He refused to accept a pardon from the emperor Napoleon in 1854, and being turned out of prison he went to Paris and asked permission to return to jail; but this being declined, he went to Spain, and afterward to Holland.

BARBEYRAC, Jean, a French jurist, born at Béziers, March 15, 1674, died March 3, 1744. He was the son of a Calvinist minister, and on the revocation of the edict of Nantes was taken to Switzerland and educated there. He taught at Berlin and Lausanne, and finally settled at Groningen as a professor of international law. He is best known for his translations from the Latin writings on public law of Grotius, Pufendorf, and others, with commentaries. He also published a supplement to the *Grand corps diplomatique*, with notes (5 vols. fol., Amsterdam, 1739), and a *Traité du jeu* (2d ed., 1737).

BARBIÉ DU BOCAGE, Jean Denis, a French geographer, born in Paris, April 28, 1760, died Dec. 28, 1825. He was a pupil of D'Anville. He classified the documents brought by Choiseul-Gouffier from Greece, and attended from 1782 to 1824 to the publication of the *Voyage pittoresque de la Grèce*, which he illustrated with many valuable maps. Meanwhile he drew up the maps attached to Barthélemy's "Travels of Anacharsis," published in 1788. In 1807 he completed an excellent map of the Morea, and wrote a curious *Notice sur un manuscrit de la bibliothèque du prince de Talleyrand*, wherein he attempted to demonstrate that the eastern coast of Australia had been visited by the Portuguese as early as 1525.

BARBIER. I. Antoine Alexandre, a French bibliographer, born at Coulommiers, Jan. 11, 1765, died in Paris in December, 1825. He studied at the college of Meaux and took orders, but afterward renounced the priesthood and married. He removed to Paris in 1794, and was commissioned to collect the books and works of art belonging to the abolished convents, in order to place them in the newly created public establishments. In 1798 he became librarian to the directory. Napoleon in 1807 made him his private librarian. In this capacity it was his duty to make reports on the most important works that were published. The libraries of the Louvre, Compiègne, and Fontainebleau were made up by him. After the return of the Bourbons he was superintendent of the private royal libraries till 1822, when he was suddenly discharged. His *Nouvelle bibliothèque d'un homme de goût* gives excellent directions for collecting a good library, and his *Dictionnaire des ouvrages anonymes et pseudonymes* is full of research, able criticism, and curious learning. He wrote many tracts and pamphlets on bibliographical subjects. **II. Edmond Jean François,** a French jurist, born in Paris, Jan. 16, 1689, died Jan. 29, 1771. His principal claim to attention is founded on his interesting *Journal historique et anecdotique du règne de Louis XV.* (Paris, 1856), embracing a period of 44 years, from 1718 to 1762. It narrates many facts not found in the newspapers of the time. **III. Henri Auguste,** a French satirical poet, born in Paris, April 28, 1805. He was a lawyer, and his first poem, a satire called *La curée*, published just after the revolution of July, 1830, created a remarkable sensation by its boldness, originality, and roughness of language. Several other poems of the same kind appeared in quick succession, *La popularité* and *L'Idole* among the number. They were collected, under the title *Iambes*, in a volume which was eagerly sought for. His popularity afterward declined. *Il Pianto* and *Lazare* obtained but moderate praise. His later works have been neglected; and it has even been questioned whether he wrote the brilliant satires attributed to him in his youth. He translated Shakespeare's "Julius Cæsar" in 1848. His latest works are *Silves* (1864) and *Trois passions* (1867). He was chosen to the French academy in 1869. **IV. Paul Jules,** a French dramatist, born in Paris in 1822. His first drama was *Le Poëte*, produced with success at the Théâtre Français in 1847. He afterward wrote *Amour et bergerie* (1848), *André Chénier* (1849), *Les derniers adieux* (1851), *La loterie du mariage* (1868), *Jeanne d'Arc* (1869), and many other dramas, comedies, vaudevilles, &c.; and in 1849 he became associated with M. Carré in furnishing Gounod with the texts for *Faust*, *Roméo et Juliette*, *Le Médecin malgré lui*, and *La reine de Saba*; Ambroise Thomas with *Hamlet*, *Mignon*, and *Psyché*; Victor Massé with *Galathée* and *Les noces de Jeannette*; and Meyerbeer with *Le pardon de Ploërmel*.

BARBIERI, Giovanni Francesco. See GUERCINO.

BARBOU, a family of French printers, distinguished for the perfection of their work. Beginning with JEAN BARBOU, who printed at Lyons in 1539, they succeeded each other as

prominent printers in the principal cities of Europe till 1808. HUGUES, the son of Jean, established himself at Limoges, where he printed in 1580 a beautiful edition of Cicero's epistles to Atticus. In 1699 the widow of CLAUDE, who carried on her husband's business at Paris, purchased of Fénelon's valet-de-chambre, who had stolen it from his master, the MS. of *Télémaque*, and printed it as far as the 208th page, when all the copies were seized by the government for political reasons and destroyed. JEAN JOSEPH lived in Paris in 1704, and was a printer and bookseller. He was succeeded in 1746 by JOSEPH GÉRARD. In 1743 the abbé Lenglet-Dufresnoy commenced the publication of a new and elegant edition of the classics to fill the place of that of the Elzevirs, then becoming rare. This project was continued by JOSEPH GÉRARD BARBOU, who was succeeded by his nephew HUGUES; and 77 volumes of the classics were printed in this form, including the works of most of the prominent Latin authors. On the death of Hugues the business passed out of the hands of the family.

BARBOUR, the name of counties in three of the United States. **I.** A N. E. county of West Virginia; area, 330 sq. m.; pop. in 1870, 10,312, of whom 386 were colored. Its surface is hilly, and its soil very fertile, and well adapted for grazing. It is drained by the constituents of the east fork of the Monongahela river. Bituminous coal and iron ore are found, and salt mines have been opened. In 1870 the chief productions were 42,305 bushels of wheat, 173,195 of Indian corn, 43,367 of oats, 10,803 tons of hay, and 31,973 lbs. of wool. Capital, Phillips. **II.** A S. E. county of Alabama, bounded E. by the Chattahoochee river, which separates it from Georgia; area, about 900 sq. m.; pop. in 1870, 29,309, of whom 17,165 were colored. It has an undulating surface, partly covered with forests of pine. The soil in the valleys of the streams is fertile, and suitable for Indian corn and cotton. The chief productions in 1870 were 364,304 bushels of Indian corn, 42,734 of sweet potatoes, 17,011 bales of cotton, and 25,738 gallons of molasses. Capital, Clayton. **III.** A S. county of Kansas, not yet settled, bordering on Indian territory; area, 780 sq. m. The Nescatunga river, a tributary of the Arkansas, intersects the S. W. corner, and a branch of the former also drains the N. and E. portions of the county.

BARBOUR, James, an American statesman, born in Orange county, Va., June 10, 1775, died June 8, 1842. While very young he served as a deputy sheriff, and at the age of 19 was admitted to the bar. He was a member of the legislature of Virginia from 1796 to 1812, when he became governor of the state. After serving two terms in this office he was elected to the United States senate (1815), where for several sessions he was chairman of the committee on foreign relations. He remained in the senate till 1825, when President John Quincy Adams appointed him secretary of war. In 1828 he became minister to England, but was recalled the next year by President Jackson, of whose administration and that of Mr. Van Buren he was a vigorous opponent. In 1839 he presided at the Harrisburg convention, which nominated Gen. Harrison for president.

BARBOUR, John, a Scottish poet and historian, born in Aberdeen about 1320, died about 1396. Little is known of his early life. He was appointed archdeacon of Aberdeen by David II. in 1356. He made two visits to Oxford by royal permission for the purpose of studying, and in 1368 obtained a passport to France for a similar object. At one time he was one of the auditors of the exchequer for King Robert II. The work which has made his name famous is his poem of "The Bruce," a history of the life and deeds of Robert Bruce. He is known to have also written a metrical romance, now lost, called "The Brute," on the mythical Brutus the Trojan. Barbour received two pensions, one charged on the customs of Aberdeen for life, and another in perpetuity from the borough rents, recorded as a reward for the production of "The Brute." At his death he assigned the latter to the chapter of the cathedral church of Aberdeen, to pay for an annual mass for his soul. The first known printed edition of "The Bruce" is that of 1616 (Edinburgh), but there is believed to have been an earlier one. The best of the later editions is that of Dr. Jamieson (4to, Edinburgh, 1820).

BARBY, a town of Germany, in the Prussian province of Saxony, on the left bank of the Elbe, 15 m. S. E. of Magdeburg; pop. in 1871, 5,212. The inhabitants are chiefly engaged in the manufacture of woollens and linens. The Moravians in 1749 established at Barby a *Pädagogium* (educational institution), which in 1809 was transferred to Niesky in Lusatia. The town has a normal school and a hospital for the blind. It was formerly the seat of the counts of Barby, who became extinct in 1659.

BARCA, a country of Africa, bounded N. by the Mediterranean, E. by Egypt, W. by the gulf of Sidra or Great Syrtis, S. by the Libyan desert. It lies between lat. 29° and 33° N., lon. 20° and 25° E., and corresponds nearly to the ancient Cyrenaica, although the boundaries are not clearly defined. The population is estimated at about 400,000, mostly nomadic Arabs and Berbers. The northwestern portion is elevated, has a healthy climate, and many fertile tracts producing rice, grain, dates, olives, sugar, tobacco, saffron, and senna; it is well adapted to the culture of grapes. The eastern and southern portions are sandy, gradually merging in the desert. The horses of the country are of a famous breed; there are sheep of the fat-tailed species, camels, and buffaloes. Barca is governed by its beys, who are tributary to the bey of Tripoli. It was an early colony of the Greeks; it afterward became subject to Egypt, and still later a province of the Byzantine empire. It was conquered by the Arabs in 641. The most important towns

are Benghazi (anc. *Berenice*), and Derne (anc. *Darnis*). (See CYRENAICA.)

BARCA, or **Barce,** an ancient inland city of Cyrenaica, founded by revolted Cyrenæans and Libyans about 554 B. C. Arcesilaus II., king of Cyrene, was signally defeated in an attempt to punish this secession, and the power of Barca was soon extended to the seacoast and W. toward Carthage. About 514 B. C. Arcesilaus III. of Cyrene, having taken refuge with his father-in-law Alazir, king of Barca, was slain by the citizens. His mother Pheretima induced the Persian satrap of Egypt to besiege Barca, and after it was captured caused numbers of the citizens to be crucified around the walls, on which she fixed as bosses the breasts of their wives. Many others were made slaves and removed to Bactria. Under the Ptolemies most of the remaining inhabitants were removed to the new city of Ptolemais (now Tolmeta) on the coast. The old town was still in existence in the 2d century of our era, and its ruins are now traced near the village of Merjeh.

BARCA, or **Barcas,** an epithet applied to Hamilcar and other Carthaginian generals, and supposed to signify "lightning," like the Hebrew Barak.

BARCELONA. **I.** A province of Spain, in Catalonia, bordering on the Mediterranean; area, 2,983 sq. m.; pop. in 1867, 749,143. It is less mountainous and better cultivated, more densely peopled, and in general more flourishing than any other Catalonian province. The Llobregat, its principal river, intersects it N. and S. It is traversed by several railways, and has good roads. Its chief products are grain, oil, wine, fruit, hemp, silk, iron, copper, and coal; there are several salt mines and numerous mineral springs. **II.** A city and seaport, capital of the above described province, situated in lat. 41° 21′ N., lon. 2° 10′ E., on the Mediterranean, 315 m. E. N. E. of Madrid, in a beautiful plain between the rivers Besos and Llobregat, at the foot of Mount Monjuich (the Mons Jovis of the Romans, the Mons Judaicus of the middle ages, so named because it was then inhabited by the Jews); pop. in 1864, 190,000; in 1868, including the large suburb of Barceloneta, 167,095. The diminution is ascribed to the mortality caused by the cholera of 1865, and the removal of much of the manufacturing industry beyond the municipal boundary. It is the most flourishing, and after Madrid the most populous city in Spain, the great manufacturing and commercial emporium, and one of the finest cities of the peninsula. The harbor is formed by a huge mole, running southward for a considerable distance from the shore; the depth of water within the mole is 20 ft. The fort of Monjuich, south of the town, stands upon the isolated hill of that name, 752 ft. above the level of the sea. It commands the city, the citadel, and the port, and is considered by the Spaniards to be impregnable. The citadel, N. E. of the town, is a regular fortress built on the system of Vauban. There are also walls, ditches, and batteries. Barcelona is the see of a bishop and the seat of an audiencia. It has a university opened in 1868, several commercial academies, and many civil, military, art, and benevolent institutions, prominent among which is the *junta de comercio*, or board of trade, which supports professorships of navigation, architecture, chemistry, experimental philosophy, agri-

Barcelona.

culture, commerce, mechanics, and foreign languages. The city is generally well built; the houses in the newer part are mostly of brick four or five stories high, with ornamented balconies. The principal streets are long, wide, well paved, and lighted. In the older portion the streets are narrower, and crooked, but picturesque. Foremost among its numerous promenades is the Rambla (so called from the Arabic *raml*, sand, applied to a dry river bed, used as a road). There is also a fine promenade around the ramparts, with pleasant views toward the sea. Among the churches are the cathedral, a fine structure, which the Moors converted into a mosque; the church of Santa Maria del Mar, erected on the site of a chapel of the Goths, the rebuilding of which was begun in 1328, and completed in 1483; and the church of San Cucufat, erected on the spot where its patron saint was martyred. Other public buildings are the *casa consistorial* and *casa de la deputacion*, the *casa lonja* or exchange, and the palace of the captain general. There are many Roman antiquities, but mostly in fragments.—The commerce and manufactures of Barcelona have received a great impulse since 1860. Many large manufacturing establishments, especially of silk and cotton, have sprung up. In 1865 there were 7 banking companies, 10 marine insurance companies, 5 railway companies, 4 steam navigation companies, 3 canal companies, and 3 gas companies. The bank of Barcelona, founded in 1844, has a capital of 80,000,000 reals ($10,000,000), of which 20,000,000 has been paid up. Railways are being gradually extended from Barcelona into the interior. The principal exports are silks and cotton goods, paper, hats, laces, ribbons, soap, steel, and firearms. The principal imports are raw cotton, sugar, coffee, cocoa, and other colonial products, mainly from Cuba and Porto Rico; salted fish, hides, and horns. Iron and coal, machinery and hardware, have lately been largely imported from England. Most kinds of manufactured goods are prohibited, but they are smuggled in considerable quantities. The coastwise trade is also very considerable. In 1863 the imports at Barcelona were $50,734,079; the exports, $16,864,490; value of imports, $41,849,940; of exports, $72,420,770.—Barcelona, according to tradition, was founded by Hercules 400 years before the building of Rome. It was reëstablished or, according to more trustworthy accounts, founded by Hamilcar Barca, the father of Hannibal, who called it Barcino, whence comes its present name. After the expulsion of the Carthaginians, it fell into the hands of the Romans, who made it a colony, known also under the name of Faventia. In the 5th century it was taken by the Goths; in the 7th century by the Arabs, from whom it was reconquered about 800 by the Christians, aided by Charlemagne. It was then governed until the 12th century by counts, who were really independent, though nominally subject to the Carlovingian kings. It subsequently became attached to the kingdom of Aragon, preserving however its most important municipal privileges. During this period the Barcelonians competed with the Italians for the commerce of the Levant, and were among the first to establish consuls and factories in distant parts for the protection of their trade. The famous code of maritime law known as the *Consolato del Mar* is said to have been compiled and promulgated at Barcelona. Marine insurance and the negotiation of bills of exchange were practised here at an early date. In 1640 Barcelona rose against the tyranny of Philip IV., and threw herself into the arms of France. It was retaken in 1652. In 1697 it was captured by the French, but restored to Spain in the same year. During the war of the succession, it espoused the cause of Austria. In 1706 it was captured by the Spaniards and English under the earl of Peterborough. In 1714 it was bombarded and taken by the French, under the command of the duke of Berwick. In 1808 it was taken by Napoleon, who held it till 1814. In 1842 it revolted against the queen of Spain, and was bombarded and taken by Espartero in December. Another insurrection, which broke out in June, 1843, was suppressed, after a bombardment, in November, and another, in July, 1856, after a few days, but with considerable bloodshed. Several minor popular movements took place both before and after the fall of Queen Isabella.

BARCELONA. **I.** A N. state of Venezuela, bounded N. by the Caribbean sea and S. by the river Orinoco; area, 13,800 sq. m.; pop. about 78,600. Except a belt of hills that border the coast, where there are excellent arable lands, and the best plantations in the state, the face of the country is composed of low plains and extensive plateaus, offering fine pasturage for cattle, horses, and mules. The chief rivers are the Neveri, Pao, and Unare. Cacao, coffee, sugar cane, cotton, maize, cocoanuts, and tropical fruits are largely produced. The state is divided into 8 cantons. **II.** A city, formerly called New Barcelona, capital of the state, situated near the mouth of the Neveri, which is here crossed by a wooden bridge, about 3 m. from the sea, and 160 m. E. of Caracas; pop. about 6,000 (in 1800, 16,000) half colored. It was founded in 1637 by Juan Urpin at the foot of the Cerro Santo, whence it was transferred to its present site in 1671 by Sancho Fernando de Agula. The city has been nearly ruined by war and revolution. There is a church and several schools. The houses are mostly of mud, ill constructed and poorly furnished; and the streets are unpaved and in rainy weather extremely filthy, while in dry weather the dust is intolerable. The harbor and shipping are protected by a fortress, on a hill 400 feet above the level of the sea. The climate, owing to the excessive heat and moisture of the air, is exceedingly insalubrious, and

the city is said by Humboldt to be one of the most unhealthy places on the globe. The surrounding country is very fertile. Barcelona exports horned cattle, jerked beef, hides, indigo, annotto, cotton, and cacao.

BARCKHAUSEN, or **Barchusen, Johann Konrad,** a German physician and chemist, born at Horn, in Westphalia, March 16, 1666, died Oct. 1, 1723. He studied medicine and pharmacy at Berlin, Mentz, and Vienna, and afterward accompanied the Venetian troops into the Morea. In 1703 he was made professor of chemistry at Utrecht. He wrote several treatises on chemistry, embodying the result of important researches, a history of medical sects, *Collecta Medicinæ Practicæ generalis* (Amsterdam, 1715), &c.

BARCLAY, Alexander, an English poet, born in the latter part of the 15th century, whether in England or Scotland is uncertain, died at Croydon in June, 1552. He was educated at Oxford, travelled through Europe, acquiring a knowledge of several languages, became a Benedictine and afterward a Franciscan, and was a monk at Ely when that monastery was suppressed in 1539. He became vicar of Great Badow in Essex and of Wokey in Somersetshire, and finally rector of All Saints in Lombard street, London, complying probably with the new ecclesiastical order. His most noted work is "The Ship of Fools," based on Brant's *Narrenschiff*. It was printed by Pynson in 1509. His "Egloges" are noted as the earliest specimens of English pastoral poetry. He also wrote "The Castle of Labour," printed by Wynkyn de Worde in 1506, and "The Myrrour of Good Manners," besides some lives of saints, a work on French pronunciation, and a translation of Sallust's "Jugurthine War." He possessed a culture and refinement unusual in his day, and did much to revive a taste for literature, which was then at a low ebb.

BARCLAY, John, a Scottish anatomist, born in Perthshire in 1760, died in Edinburgh in 1826. He studied divinity at the united college of St. Andrews, was licensed as a preacher, visited Edinburgh as tutor in the family of Sir James Campbell, where he commenced the study of anatomy, acted as assistant to Mr. John Bell, and graduated in 1796, when he went to London and studied under Dr. Marshall. On his return to Edinburgh in 1797, he gave lectures on anatomy. He published several works on anatomy, and made some efforts toward reforming the system of anatomical nomenclature. He bequeathed his valuable anatomical collection to the royal college of surgeons of Edinburgh, where it is known as the Barclayan museum.

BARCLAY, John, an English Latin author, son of William Barclay, born at Pont-à-Mousson, France, Jan. 28, 1582, died in Rome, Aug. 12, 1621. He was educated at the Jesuits' college of Pont-à-Mousson, and the Jesuits endeavored to induce him to join their order; but his father refused to give his consent and took him to England in 1603. At the beginning of the following year he presented James I. with a Latin poem entitled *Kalendæ Januariæ*, and afterward dedicated to him the first part of *Euphormionis Lusinii Satyricon*. He was not successful in obtaining preferment in England on account of being a Catholic, and returned more than once to France, and married there. He resided in England from 1606 to 1615. In 1609 he published his father's work *De Potestate Papæ*. This was attacked by Cardinal Bellarmin, and John Barclay published a large volume in Latin in answer to the cardinal, to which a reply was made by the Jesuit Eudæmon. The fourth part of the *Satyricon* was published in 1614. It is a satirical romance directed against the Jesuits. His resources in England being scanty, he went to Paris in 1615 and remained there until the following year, when he removed to Rome on the invitation of Pope Paul V. He published at Rome an *Apologia pro se* (often printed with the *Satyricon*), in which he defended himself against the charges of heresy brought against him by the Jesuits, and his *Parænesis ad Sectarios*. He was treated with great kindness at Rome, but not obtaining any appointment devoted himself to literary pursuits and to the cultivation of flowers. He shared in the passion for the tulip which then began to spread throughout Europe. Here he composed the *Argenis* (London, 1621), his most celebrated work, a prose romance in Latin, in which political questions are discussed with great spirit and originality in feigned dialogue. This book was a favorite with Cardinal Richelieu and Leibnitz, was more read than any other work of its day, and has been translated into almost every language of Europe. Its Latin style is highly praised by Grotius.

BARCLAY, or **Barclay-Allardice, Robert,** commonly known as Captain Barclay, a British pedestrian and a captain in the British army, born Aug. 25, 1779, died May 8, 1854. His father, a skilful farmer, descended from the famous Quaker, Barclay of Ury, was himself a noted pedestrian, having walked 510 miles in 10 days. His son at the age of 15 won his first match, walking 6 miles within an hour. In December, 1799, he walked 150 miles in two days; in June, 1800, 300 miles in five days; in 1801, 110 miles in 19 hours 27 minutes; and in 1806, 100 miles in 19 hours, on a hilly public road. One of his most surprising performances was walking 1,000 miles in 1,000 successive hours; £100,000 were staked on the result. After the feat was accomplished, Barclay slept 17 hours, and awoke in his usual health and vigor. He afterward trained Tom Cribb, champion of England, for his fight with Molyneux, which took place Sept. 29, 1811. In the latter part of his life Captain Barclay devoted himself to the cultivation of his paternal estate, and to breeding sheep and cattle. In right of his mother, Sarah Ann Allardice, he received a charter of the barony of Allardice

in 1800; and in 1839 he laid claim to the barony of Airth, as heir through her of William Graham, last earl of Airth and Monteith (died 1694).

BARCLAY, Robert (called Barclay of Ury), a distinguished member of the society of Friends, born at Gordonstown, Scotland, Dec. 23, 1648, died at Ury, Oct. 13, 1690. He was sent for his education to the Scotch college at Paris, of which one of his uncles was rector; but efforts having been made to convert him to Catholicism, he returned home about 1664. In 1667 he embraced the principles of the society of Friends, and in 1670 vindicated them from charges which had been brought against them in a publication entitled "Truth cleared of Calumnies." He published in 1676 in Latin, and in 1678 in English, "An Apology for the True Christian Divinity, as the same is held forth and preached by the People called in scorn Quakers." Its dedication to King Charles II. is a model of frankness and independence. It was the ablest defence that had been made at that time of the doctrines of the Friends, and is perhaps the ablest that has ever been made. It materially affected public sentiment in regard to the Friends. His "Treatise on Universal Love" (1677) was the first of the remonstrances which have been made by the Friends against the criminality of war. He made various journeys in England, Holland, and Germany, generally in company with William Penn, for the propagation of his doctrines, and was several times imprisoned on account of them; but the English government upon the whole was indulgent toward him. Charles II. was his friend, and in 1679 made his estate of Ury a free barony with the privilege of criminal jurisdiction. He was appointed in 1682 by the proprietors of East Jersey in America governor of that province, but he only exercised the office by deputy.

BARCLAY, William, a Scottish jurist, born in Aberdeenshire in 1541 or 1546, died at Angers, France, in 1605. He studied law at Bourges, under Cujas, and received the degree of doctor of laws. He was soon after appointed professor of the civil law in the university of Pont-à-Mousson, then recently founded by the duke of Lorraine. He was also made counsellor of state and master of requests. Having quarrelled with the Jesuits on account of his refusal to let his son enter the society, he lost favor, went to England, and was offered a professorship of law upon condition that he would renounce the Roman Catholic faith. This he refused, and returned to France, where he was made professor of law at Angers. During the troubles of the league he supported the royal cause and was uniformly an opponent of the ultramontane doctrines. His principal works are: *De Regno et Regali Potestate* (Paris, 1600); a commentary on the title of the Pandects *De Rebus Creditis et de Jure Jurando;* and a treatise *De Potestate Papæ* (London, 1609), in which the independent rights of sovereign princes against the pope are vindicated.

BARCLAY DE TOLLY, Michael, prince, a Russian general, born in Livonia in 1759, died at Insterburg in East Prussia, May 25, 1818. He was a descendant of the Scottish Barclays. Being adopted by Gen. Van Vermoulen, he entered a Russian regiment of cuirassiers as a sergeant, and served with credit in the Turkish war of 1788–'9, in the Swedish campaign of 1790, and in the campaigns against Poland in 1792 and 1794. In the Polish campaign of 1806 he was a major general, and distinguished himself at Pultusk as the commander of Benningsen's advance guard. He defended Eylau with great bravery in 1807, and there lost an arm and won the title of lieutenant general. In 1809 he marched with 12,000 men for two days on the ice across the gulf of Bothnia, and compelled the Swedes to surrender at Umea. He was soon after made governor of Finland, and in 1810 became minister of war, in which office he remained three years. In 1812 he took command of the first army of the west, the second being under Prince Bagration, and conducted the retreat to Smolensk for the purpose of drawing the enemy into the interior of the country. This retreat and the loss of the battle at Smolensk gave the Russian national party, who hated him as a foreigner, an opportunity against him, and he was superseded in the command by Gen. Kutuzoff. He led the right wing on the Moskva, did brilliant service in 1813 at Bautzen, and was again placed in chief command of the army. He took part in the battles of Dresden, Culm, and Leipsic, and in 1814 was made a prince and field marshal. After visiting London with the emperor Alexander, he returned to the army at Warsaw, and remained in command until the war was over.

BAR-COKHEBA, or **Bar-Cochebas,** the leader of a Jewish insurrection during the reign of Hadrian, killed A. D. 135 or 136. His real name is believed by some critics to have been Simeon, but his followers called him Bar-Cokheba (son of a star), and applied to his appearance the prophecy of Balaam, "There shall come a star out of Jacob," &c. The harshness of the Roman rule in Judea made the people eager for an insurrection, and Bar-Cokheba was readily supported by the great rabbi Akiba and his numerous disciples. In 131 he gathered a large army, took Jerusalem and other important places, proclaimed himself the Messiah and ruler of the Jews, and had coins struck in his own name. Hadrian ordered Julius Severus from Britain to the scene of the insurrection. Jerusalem was retaken and the whole province desolated, but Bar-Cokheba long maintained himself at Bethar, fighting obstinately, and falling when that fortress was finally stormed. All his prominent followers were executed. The insurrection cost hundreds of thousands of lives, and was followed by greater oppression than ever.

BARD (Cymric, *bardh;* Gaelic, *bard*), a professional poet, who made his livelihood by

singing the amours and battles of gods, the deeds of heroes, the glory and genealogy of chiefs, and the victories of tribes over their enemies. Bards were called ἀοιδοί or rhapsodists by the Greeks, *vates* by the Latins, *scalds* by the Scandinavians, *scopes* by the Anglo-Saxons, *ollamhs* by the Irish, and *baydars* and *spiewaks* by the Slavs. In ancient Gaul they were a subdivision of the druids, or the priestly and learned order. Cæsar says that they spent 20 years in their education, acquiring the knowledge by rote of an immense number of verses, which they did not record in writing, but handed down by word of mouth from generation to generation. After the subjugation of Gaul this profession was put under restrictions, and eventually annihilated by the Roman civil power both in Gaul and in that part of Britain which fell within the pale of Roman civilization. Wales, Cornwall, Cumberland, and Strathclyd, only remotely affected by the Roman conquest, kept alive the flame of minstrelsy. In the parish of Llanidan, in the isle of Anglesey, are the remains of an archdruid's palace, surrounded by the several colleges into which druidism was divided. One of these colleges, or independent buildings, is called by the peasantry at this day *trer beird*, or hamlet of the bards. Each chief of a clan in Britain had a bard, whose office was hereditary in the family. At the feasts of Christmas, Easter, and Whitsuntide the *bardd teulu*, or court bard, sat next to the master of the ceremonies, and received the steward's robe as his fee. The bard who had won in the musical contest of the day was to sing, first to the glory of God, secondly to the glory of the prince; and then the *teuluier*, or regular court bard, was to sing on the topics of the day. On investment, the court singer received a harp from the prince and a ring of gold from the queen. The pagan tendencies of these singers finally led to their discouragement, and in 1078 Gryffyth Conan, prince of Wales, issued edicts placing them under rigid restrictions. Many of the Welsh bards abandoned their profession at this change, and their places were supplied by ollamhs from Erin, who introduced into Wales all the instrumental music for many centuries in use there. In the edicts of Conan the bards were classified in several ways: 1, the bards of the princes and nobles, or *pruddud;* 2, bards of the middle ranks, or *selmar;* 3, bards for the lower classes, or *clewr*. There were three special sub-classes, viz., composers, instructors of the rising generation, and heralds. Some professed the faculty of second sight, as diviners, sorcerers, interpreters of dreams, &c. For mutual encouragement and instruction, public sessions of the Welsh bards (*eisteddfods*) were held for many centuries at the town of Caerwys, the residence of the prince of Wales; at Aberfraw, in Anglesey, for the bards of that island and the adjoining county; and at Mathraval, for those of the land of Powis. Only minstrels of skill performed, and degrees were conferred according to the branch in which the victors had perfected themselves. After the conquest of Wales by Edward I. of England (1282), royal commissioners were appointed who presided over the eisteddfods, and acted the part of censors and inquisitors. No bardic poem was allowed to be circulated which appealed to the patriotic sentiments of the conquered race. The story of the massacre of the Welsh bards and the destruction of their records is a fiction, originating in Edward's stringent measures against the right of free song. The last eisteddfod held under royal commission was in the reign of Elizabeth, at Caerwys, in 1569. On this occasion, the victor of the silver harp was Simon ap Williams ap Sion. Various persons received degrees, some as chief bards of vocal song, others as primary, secondary, or probationary students; and many more as bards, students, and teachers of instrumental song upon the harp. The degrees were four in the poetical and five in the musical faculty. Toward the end of the last century some patriotic Welsh gentlemen determined to revive the eisteddfod. In 1770 the Gwyneddigion society was formed, in 1818 the Cambrian society, and some years later the Cymmoridian, or metropolitan Cambrian institution, of which George IV. of England declared himself the patron. Annual meetings have since been held for the recitation and reward of prize poems, and performances upon the harp. The above-named societies have been instrumental in preserving relics of the poems of Myrddyn ap Morfryn, Myrddyn Emrys, Talliesin, and other less celebrated composers of triads. The bards of Ireland formed a hereditary guild, and were divided into three classes, the *filedha*, who sang in the service of religion and in war, and were counsellors and heralds to the princes; the *breitheamhaim*, who chanted the laws; and the *seanachaidhe*, who were chroniclers for princes and nobles. They were anciently held in high esteem, but their tendency to foster a rebellious spirit led to their suppression. Turlogh O'Carolan, who died in 1737, is generally regarded as the last Irish bard. The bards of Scotland are believed to have been on a similar footing with those of Ireland, but nothing is known of their actual history, and no remains of their songs have been preserved.

BARD. I. John, an American physician, born near Philadelphia, Feb. 1, 1716, died March 30, 1799. He removed to New York in 1746, where he rose to the first rank among physicians. In 1759, on the arrival of a ship on board of which a malignant fever was raging, Dr. Bard was appointed to take measures to prevent the disease from spreading. He succeeded in keeping the pestilence within the limits of a temporary hospital, but to guard against similar dangers in future, at his suggestion Bedloe's island was purchased, and hospital buildings were erected thereon, which were placed under his charge. Upon the estab-

lishment of the New York medical society in 1788, he was elected its first president. He left an essay on malignant pleurisy, and several papers on the yellow fever. **II. Samuel,** an American physician, son of the preceding, born in Philadelphia, April 1, 1742, died May 24, 1821. He studied at King's (now Columbia) college, New York, and at the medical school of Edinburgh. On his way to Edinburgh he was captured by a French vessel, and was released by the influence of Dr. Franklin, who was then residing in London. After taking his degree he travelled through Scotland and parts of England, studying minerals, plants, animals, arts, and manufactures. Returning to America in 1767, he entered at once upon the practice of his profession in New York, in partnership with his father. He effected the organization of a medical school, which was united to King's college, and in which he was appointed professor of the practice of physic, and subsequently became dean of the faculty. After the revolutionary war he was for a time Washington's family physician, the general government being then in New York. Through his influence a public hospital was opened in New York in 1791, and he was appointed its visiting physician. He retired in 1798 to his country seat in New Jersey, and devoted himself to agricultural pursuits. In 1813 he was appointed president of the college of physicians and surgeons in New York. He left several tracts on medical subjects.

BARDAS, a patrician of Constantinople, brother of Theodora, the wife of the emperor Theophilus, and uncle to the emperor Michael III., killed April 21, 866. On the death of Theophilus (842) he was appointed tutor to the young prince Michael, in conjunction with Theoctistus and Manuel. He did much to revive science, but caused Theoctistus to be slain and Manuel to be banished, threw his sister the empress into prison, exiled the patriarch Ignatius, and assumed the title of Cæsar (856). His cruelty and arrogance raised a bitter opposition, and Michael at last consented to his assassination by Basil the Macedonian, afterward emperor.

BARDESANES, or **Bar-Deisan,** a Gnostic, who flourished at Edessa, Syria, in the latter half of the 2d century, and founded a sect designated as Bardesanists. The common opinion is that Bardesanes was a disciple of Valentine, but Neander thinks that both Marcion and Bardesanes drew from the same fountain as Valentine, the Syrian Gnosticism. From the fact that Bardesanes wrote afterward against the Gnostics, and then, still later, showed himself a Gnostic again, he has been accused of being fickle; and Eusebius says of him that, although he refuted at one time most of the opinions of Valentine, "he did not entirely wipe away the filth of his old heresy." Neander thinks there is no evidence that Bardesanes was other than a Gnostic in the whole of his career as a theologian. He believed the devil to be self-existent and independent; that Christ was born of a woman, but brought his body from heaven; and he denied the resurrection of the human body.

BARDILI, Christoph Gottfried, a German metaphysical writer, born at Blaubeuren, in Würtemberg, May 28, 1761, died in Stuttgart in 1808. He is principally known by his work on the elements of logic, published in 1800, and directed against the philosophy of Kant. He was a very abstruse and obscure writer, but his system contains the germ of the later philosophy of absolute identity.

BARDIN, Jean, a French historical painter, born at Montbard, Oct. 31, 1732, died at Orleans, Oct. 6, 1809. He studied painting in Rome, and under Lagrenée and Pierre in Paris. In 1764 he gained the prize for his picture of "Tullia driving over the Body of her Father." He afterward became a member of the institute and director of the school of fine arts at Orleans. His *chef-d'œuvre*, "Christ disputing with the Doctors," procured him admission to the academy in 1795. Among his pupils were David and Regnault.

BARDINGS, horse armor of the middle ages. See ARMOR, vol. i., p. 734.

BARDSTOWN, or **Bairdstown,** a post town and the capital of Nelson county, Ky., situated on an elevated plain near the Beech fork of Salt river, 40 m. by rail S. E. of Louisville, on a branch of the Louisville and Nashville railroad; pop. in 1870, 1,835. It is the seat of a Roman Catholic theological seminary, and preparatory seminary. It contains several churches, and has factories of cotton, woollen, and other fabrics.

BAREBONE, Praise God, an English fanatic in the time of Cromwell. He was a leather dealer in London, and a conspicuous member of the short parliament called together by Cromwell in 1653, which was on that account nicknamed Barebone's parliament. When Gen. Monk came to London, Barebone marched at the head of a large procession of the people and presented to parliament a remonstrance against the restoration of the king. In 1661 he was arrested and thrown into the Tower on a charge of being concerned in a plot against the government. He was afterward released, but his further history is unknown. It is said that two of his brothers assumed the names respectively of "Christ came into the World to save Barebone," and "If Christ had not Died Thou hadst been Damned Barebone."

BAREFOOTED FRIARS AND NUNS, religious orders in the Roman Catholic church, which discard the use of coverings for the feet, either at all times or at special seasons. Thus the nuns of our Dear Lady of Calvary go unshod from May 1 to Sept. 14. Some wear sandals of wood, leather, or platted rope, fastened to the feet by thongs. About 25 different orders of barefooted friars and nuns are enumerated, the most prominent of which are: The barefooted monks of St. Augustine, who spread over France and the Indies; the barefooted

nuns of St. Augustine; the barefooted Carmelites of Avila, male and female, in Spain, Portugal, France, Italy, Germany, and India; the barefooted Trinitarians, in Spain, Italy, France, Germany, Poland, Hungary, and Bohemia; nuns of St. Francis of the stricter observance, established in France in 1593, and afterward endowed with the convent of Picpus in Paris, whence they are often called *les Picpus*, and the Passionists.

BARÉGES, a French watering place in the department of Hautes-Pyrénées, 25 m. S. of Tarbes, situate in the Bastan valley, 4,000 feet above the sea, between two chains of mountains. The village consists of one long street on the Gave de Bastan, and forms part of a commune with only about 600 permanent inhabitants, who escape from the snow and avalanches during the winter to the town of Luz. The fine silk crêpe tissue first took its name from Baréges, though chiefly manufactured at Bagnères de Bigorre. During summer and autumn Baréges can accommodate about 800 invalids and visitors. The springs rise near the junction of the slate rock with the granite, and are celebrated for curing ulcers, rheumatism, scrofula, tumors, and gunshot and other wounds. Their principal ingredients are sulphuret of sodium, carbonate, muriate, and sulphate of soda, azotic and sulphuretted hydrogen gases, and animal matter. Their temperature varies from 73° to 120° F. They have been known since the 16th century, but became fashionable only at the end of the 17th, after they had been successfully employed by Madame de Maintenon for the cure of the crippled duke de Maine, Louis XIV.'s natural son. A new bath house was erected by the French government in 1864, and the springs are described in Dr. Macpherson's "Baths and Wells of Europe" (1869). Baréges is the seat of a famous military hospital.

BAREILLE, Jean François, abbé, a French theologian, born at Valentine, Haute-Garonne, in 1813. He received a superior education and became honorary canon of the dioceses of Toulouse and Lyons, and afterward director of a school at Sorèze. He has published *Histoire de Saint Thomas d'Aquin* (1846; 4th ed., 1862), and *La vie du cœur* (1856; 3d ed., 1863); and he has translated several works of Balmes, the *Œuvres complètes de Louis de Grenade* (21 vols., 1861–'6), and the *Œuvres complètes de Saint Jean Chrysostome* (10 vols., 1864–'7, and 4 vols., without the original text, 1866–'7). The French academy in 1868 conferred one of the Monthyon prizes upon his translation of the *Homélies* in the 3d volume of the last-mentioned edition.

BAREILY, a city of the Northwest Provinces of Hindostan, capital of a district of the same name, in the region of Rohilcund, on a branch of the Ganges, in lat. 28° 23′ N. and lon. 79° 26′ E., 122 m. E. by S. of Delhi; pop. 92,000, two thirds of whom are Hindoos. It was ceded to the British in 1801. The officials live in a citadel outside the town. The inhabitants are engaged in the manufacture of swords, daggers, carpets, saddles, housings, embroidery, jewelry, brass wares, and cabinet work. In the last two of these branches of manufacture they particularly excel. The sepoy garrison mutinied May 31, 1857, and killed every European that fell in their way. The place was recovered by Sir Colin Campbell in the following year.

BARENTZ, Willem, a Dutch navigator, died June 20, 1597. He was appointed chief pilot of the vessel fitted out by the city of Amsterdam in the expedition which sailed from Holland June 5, 1594, in search of a passage to China and India northward of Asia. The ship in which Barentz sailed explored Nova Zembla, sailed to the N. E. extremity of the island, reaching lat. 77°, and then turned back (Aug. 1). The next year the government of Holland equipped a second expedition of seven vessels, spending half the summer in loading them with rich merchandise for the East. Barentz was appointed head pilot of the whole expedition, but it started so late in the season that nothing of importance was accomplished. The city of Amsterdam despatched a third expedition, consisting of two ships, under Jacobus van Heemskerk and Jan Cornelisz Ryp, May 18, 1596. Barentz was the pilot on one of them. The two vessels visited Spitzbergen together, and afterward parted company. Barentz's vessel sailed in the direction of Nova Zembla, and succeeded in doubling its N. E. extremity, but then encountered ice, and being unable to continue its voyage eastward, turned southward Aug. 25. On Sept. 1 it was frozen up in Ice Haven, and the crew were forced to spend the winter there "in great cold, poverty, misery, and grief," and with no sun from Nov. 4 to Jan. 24. The crew, with the exception of two who had died, quitted Ice Haven June 14, 1597, in two open boats, and Barentz died a few days afterward. The survivors after two and a half months reached the N. E. shore of Lapland, and were there rescued by Cornelizs.

BARÈRE DE VIEUZAC, Bertrand, a French revolutionist, born at Tarbes, Sept. 10, 1755, died in January, 1841. He was educated for the law. In 1789 he was elected a deputy to the states general, and published a journal, *Le point du jour*, in which he gave an account of the proceedings of that body. He took part in nearly every debate, always being foremost in the popular movements of the time. On the death of Mirabeau he was chosen to deliver the panegyric. On the adjournment of the assembly he was appointed one of the judges of the *tribunal de cassation*. In 1792 he was elected a member of the convention, where he voted for the immediate death of the king. He was elected a member of the committee of public safety in 1793, and at first avoided committing himself to either party; but when the ascendancy of the Jacobins was

secured, he proposed the prosecution of the Girondists and the death of Marie Antoinette, the confiscation of all property belonging to outlawed citizens, the formation of a revolutionary army, the declaration that "terror was the order of the day," and the transportation of all who had not given evidence of their patriotism (*civisme*) previously to a certain day. The florid and bombastic style in which he set forth the atrocious measures of the terrorists won for him the title of the Anacreon of the Guillotine. He was distrusted, however, by his associates, and was only saved from proscription by Robespierre, whose name nevertheless he was afterward one of the most zealous in defaming. Despite the violence of his ingratitude, a commission was appointed after Robespierre's fall to inquire into the conduct of Barère, Collot-d'Herbois, and Billaud-Varennes, and in March, 1795, they were sentenced to transportation. Barère was nearly torn to pieces by the mob on his way to jail. He escaped from prison, and was chosen to the corps législatif in 1797; but the election was declared null, and his arrest was ordered again. He remained in hiding until after the 18th Brumaire, when he was included in the amnesty. He was employed by Fouché to write pamphlets in the interest of Bonaparte, and the first consul made him the editor of the *Mémorial anti-britannique*. The paper failed, but Barère had in the mean time become one of the writers for the *Moniteur*. During the hundred days he was called to the house of deputies, and published the *Théorie de la constitution de la Grande Bretagne*, which produced a great impression. On the second return of the Bourbons he was banished as a regicide, and took refuge in Belgium. After the revolution of 1830 he returned to France, and was in 1832 elected deputy, but on account of some informality his election was declared void. He became a member of the general council of his department, and resigned in 1840. He published a great number of historical, political, and miscellaneous works, and two volumes of *Mémoires* (Paris, 1834), a new edition of which appeared in 1843.

BARETTI, Giuseppe, an Italian writer, born in Turin, March 22, 1716, died in London, May 5, 1789. He was intended by his father for the bar, but, disliking the study, took to literature. After travelling in southern Europe he went in 1751 to London as a teacher of Italian, became intimate with Dr. Johnson, and published the "Italian Library," in which he gave an account of the principal authors of his native country. He afterward spent nine years on the continent, wrote an excellent book of "Travels through England, Portugal, Spain, and France," and established at Venice the *Frusta letteraria* ("Literary Scourge"), which he made so personal that he was obliged to leave the city. Returning to London in 1769, he stabbed a man in a street brawl and was tried for murder, but acquitted, Johnson, Burke, and Garrick testifying to his inoffensive character. He was for several years foreign corresponding secretary of the royal academy. He published an English-Italian and Italian-English dictionary, which is still in high esteem; an Italian and English grammar; a Spanish and English dictionary; "Introduction to the most useful European Languages;" "Account of the Manners and Customs of Italy," &c.

BARGAIN AND SALE, a contract in relation to real estate, which has introduced a form of conveyance now generally used in England and this country. By the ancient English law, there could be no transfer of lands without livery of seisin, which was an actual or constructive delivery of possession by a prescribed formality. A sale of lands in any other mode did not change the title, but it was held that if a pecuniary consideration had been paid, a contract of sale would raise a use for the benefit of the vendee, or in other words, that the effect would be that the vendor would hold the lands for the use of the vendee, and could be compelled to account for the profits. The statute 27 Henry VIII., called the statute of uses, annexed the possession to the use, or executed the use, as the lawyers expressed it, thereby making the party for whose use the lands were held, technically called the *cestuy que use*, the complete owner of the lands. By the same statute it was required that a deed of bargain and sale should be enrolled in one of the courts of Westminster, or in the county where the lands lay, which furnished the suggestion of the practice now universal in this country of recording deeds. The effect was that in cases of freehold—the statute of uses being held not to apply to lesser estates—the deed of bargain and sale transferred a complete title without livery of seisin; and that form of conveyance in consequence was brought into common use. (See Trusts, and Uses.)

BARGE, an old town of Piedmont, at the foot of the Monbracco, about 30 m. S. W. of Turin; pop. about 7,000. It has a college, a good trade, manufactories of firearms, and slate quarries. It suffered severely from an earthquake in 1808.

BARHAM, Richard Harris, an English humorist, born at Canterbury, Dec. 6, 1788, died in London, June 17, 1845. He was educated at London and Oxford, studied law, but afterward devoted himself to theology, took orders, and obtained a living in Kent. While confined with a broken leg, he wrote a novel called "Baldwin," which attracted little notice. In 1821 he was elected minor canon of St. Paul's cathedral, and removed to London. His leisure was there devoted to writing for Gorton's "Biographical Dictionary," and occasional pieces for periodicals, and contributing to "Blackwood's Magazine" a serial story of college life entitled "My Cousin Nicholas." In 1824 he was appointed priest of the chapel royal, and presented to the united metropolitan livings of St. Mary Magdalene and St.

Gregory by St. Paul. In 1837, on the establishment of "Bentley's Miscellany," Mr. Barham contributed, under the pseudonyme of Thomas Ingoldsby, the "Ingoldsby Legends," a series of humorous stories, chiefly in verse, which became very popular. Three volumes of these legends were finally collected, to the last of which was prefixed a life of the author. In 1840 Mr. Barham succeeded for a year to the presidency of Sion college. In 1842 he was promoted to the divinity readership of St. Paul's, and allowed to exchange his living for that of St. Faith.

BARI (anc. *Barium*), a seaport of Italy, on a small peninsula of the Adriatic, capital of the province of Terra di Bari, 140 m. E. of Naples; pop. in 1872, 50,524. It is surrounded by strong walls and further defended by an old Norman castle nearly a mile in circuit. It has a good harbor, carries on an active trade with Trieste and the Dalmatian coast in corn, oil, wine, &c., and is environed by extensive olive and almond plantations. The priory of San Nicolò in Bari is a magnificent old structure in the Lombard style, founded in 1087 for the purpose of receiving the remains of St. Nicholas, which were brought from Myra in Lycia and deposited in a splendid crypt. Roger II. was here crowned king of Sicily; and Bona Sforza, queen of Poland, was buried in a vault of the church in 1557. The cathedral of San Sabino was once a fine Gothic structure, but has been spoiled by modern repairs. In the time of Charlemagne Bari was the principal stronghold of the Saracens on the Adriatic. About 870 it was taken by the emperor Louis II. after a siege of four years. In the 10th century it was held by the Greek emperors, who made it the seat of the governor of all the Greek possessions in Italy. In the 11th century it was taken by the Normans under Robert Guiscard.

BARI, or **Baris,** a negro tribe of Gondokoro and other places on the White Nile, savage in character and excessively brutal in appearance. Sir Samuel Baker says in his "Albert N'yanza" (1866): "The women are not prepossessing, but the negro type of thick lips and flat nose is wanting; their features are good, and the woolly hair alone denotes the trace of negro blood." The only hair upon the heads of the men is a small tuft, in which they stick feathers. Their villages are circular. They inhabit a region capable of the highest cultivation. Goats, sheep, and cattle are very small, but extremely prolific. The poorer classes are employed in fishing and in manual labor. They live under chieftains in a patriarchal fashion, practise polygamy, and are under the influence of weather prophets and doctors. The hut of each family is surrounded by an impenetrable hedge of euphorbia, the interior generally consisting of a yard plastered with a cement of ashes, cow dung, and sand. When not at war with the slave and ivory traders, they are generally at war among themselves.

BARI, Terra di, a province of S. Italy, bounded N. E. by the Adriatic, and on the other sides by the provinces of Capitanata, Basilicata, and Terra d'Otranto; area, 2,295 sq. m.; pop. in 1871, 604,518. The southern part is crossed by a ridge from the Apennines, which affords little else but pasturage; but the lower lands are fertile, and wheat is produced in great quantities; the other crops are olives, tobacco, cotton, flax, and fruits. Wine and oil are largely manufactured, and along the coast there are extensive fisheries and salt works. Ship-building is carried on to some extent. Terra di Bari formed the portion of ancient Apulia known as Apulia Peucetia, and was traversed by the Appian Way. Capital, Bari.

BARILLA (Span. *barrilla*), or **Soda Ash,** a crude carbonate of soda, procured by the incineration of the *salsola soda*, *salicornia*, and other plants which are cultivated for this purpose in Spain, Sicily, Sardinia, and the Canary Islands. In Alicante the plants are raised from seed, which is sown at the close of the year in salt marshes near the coast, and they are usually fit to be gathered in September following. In October the plants are dried like hay, and then burned in holes in the ground capable of containing a ton or a ton and a half of soda. Iron bars are laid across these cavities, and the dried plants, stratified with dry seeds, are placed upon them. The whole is set on fire, and the crude soda runs out in a red-hot fluid state and collects in the bottom of the pit. As fast as one portion is consumed fresh material is added, until the cavity is filled with the alkali. The holes are then covered with earth, and the soda is allowed to cool gradually. The spongy mass, when sufficiently cold, is broken up and packed for shipment without further preparation. It rarely contains more than 20 per cent. of carbonate of soda; the impurities are chiefly common salt and sulphates of soda, lime, and alumina, with some free sulphur. Soda ash is now manufactured artificially from common salt according to the method of Le Blanc. Kelp, made from the drift sea plants of the north of Scotland and Ireland, and varec on the northern coast of France, of similar origin, are still more impure than barilla. The principal uses of barilla are to furnish the alkali required in the manufacture of glass and soap.

BARIMA, a river of South America, rising in the Imataca mountains of Venezuela, flowing E. into British Guiana, and then N. W. to the estuary of the Orinoco, which it enters just W. of the headland of Barima, in lat. 8° 46′ N., lon. 60° W. Sixty miles above its mouth a natural canal 8 m. long connects it with the Guaini, a stream navigable for 70 m., having a depth of from 4 to 11 fathoms. The country bordering both streams abounds in the valuable black mora timber, and a great variety of other useful wood, as the bullet tree, red cedar, lancewood, silverballs, &c. The climate of this region is extremely unhealthy.

BARINAS, or **Varinas.** **I.** An inland state of Venezuela, bounded N. W. by a chain of the Andes, which separates it from Merida and Trujillo; area, 24,000 sq. m.; pop. about 126,000. The larger portion of the state is composed of delightful savannas, with luxuriant pasture for innumerable herds of cattle, flocks of sheep, and droves of asses and mules. The hill country in the W. part presents gentle declivities, which are very fertile; the mountain slopes and surrounding tracts are covered with virgin forests; while above the temperate line are cold regions terminating in arid paramos, extending into the states of Merida and Trujillo. The beautiful valleys of Barinas are watered by the Portuguesa, Boconó, Guanare, Uribante, Caparro, Surepá, Santo Domingo, Masparro, Pagüey, and Canagua rivers, all tributaries of the Apure, which flows on the S. border. The principal products are coffee, cacao, cotton, indigo, excellent tobacco, and an endless variety of tropical fruits. **II.** A city, capital of the state, on the right bank of the river Santo Domingo, 262 m. S. W. of Carácas; pop. about 12,000 (in 1839, 4,000). This city, which has twice changed its site, was founded in 1576 by Juan Andrés Varela, and first named Altamira de Cáceres, in honor of the governor of that name. It was once in a prosperous condition; but during the wars of independence it was besieged, sacked, and laid in ruins by the royalists. It has made rapid progress, however, of late years. Barinas has a church, a hospital, and some schools; the houses are remarkably neat; the streets are regular and clean; and its name is famed in European markets for the superior quality of its tobacco, the chief article of export. Its shipping point is Toruno, a small town 14 m. distant, at the head of river navigation.

BARING, the name of a mercantile family of London. JOHN BARING came from Bremen, and settled in Exeter in the first part of the 18th century. He had four sons, two of whom, John and Francis, established the house of Baring Brothers and company in London in 1770. **I.** Sir **Francis,** born April 18, 1740, died Sept. 12, 1810. Having been elected director of the East India company, he became a zealous supporter of Mr. Pitt's policy, and was rewarded with a baronetcy in May, 1793. His "Observations on the Establishment of the Bank of England" (1797) had great weight in the question of renewing the charter of that institution. Three of his sons, Thomas, Alexander (see ASHBURTON), and Henry, had already been associated in the business; but Henry (died April 13, 1848) quitted it and accompanied Lord Macartney in his embassy to China, and afterward took the superintendence of the East India company's factories at Canton. **II.** Sir **Thomas,** eldest son of Sir Francis, born June 12, 1772, died April 3, 1848. He sat from 1830 to 1832 in the house of commons, and was known to the public as a patron of art and by his fine collection of pictures. **III. Francis Thornhill,** a lawyer and statesman, eldest son of Sir Thomas, born April 20, 1796, died Sept. 6, 1866. He entered parliament as member for Portsmouth in 1826; was a lord of the treasury from 1830 to June, 1834; a secretary of the treasury from June to November, 1834, and from April, 1835, to 1839; chancellor of the exchequer from 1839 to 1841; and first lord of the admiralty from January, 1849, to the dissolution of the Russell ministry in March, 1852. In January, 1866, he was created Baron Northbrook. He never took an active part in the business of the firm. **IV. Thomas George,** second Lord Northbrook, eldest son of the preceding, born in 1826. He is a graduate of Oxford, and was a lord of the admiralty in 1857–'8, under-secretary of state for India in 1859–'61, and under-secretary for war in 1861–'6 and 1868–'72. He was a member of parliament for Penryn and Falmouth from 1857 to 1866, when on the death of his father he succeeded to the peerage. In February, 1872, after the assassination of Earl Mayo, he was appointed viceroy and governor general of India. **V. Charles,** another son of Sir Thomas, entered the church, became bishop of Gloucester and Bristol in 1856, and was translated to the see of Durham in 1861.

BARING-GOULD, Sabine, an English clergyman and author, born at Exeter in 1834. He is a descendant of Charles Baring, brother of the first Lord Ashburton. He was educated at Clare college, Cambridge, where he took his degree in 1856. In 1862 he visited Iceland for the purpose of studying the Norse tongue, and in 1863 published "Iceland: its Scenes and Sagas." In 1865 he took orders, and for a while was curate at Horbury near Wakefield. His present parish is Dalton, near Thirsk (1872). His remaining works are: "Post-Mediæval Preachers" and "The Book of Were-Wolves" (1865); "Curious Myths of the Middle Ages" (1869); "In Exitu Israel," a historical novel (1870); "The Origin and Development of Religious Belief," in two parts, the first treating of "Heathenism and Mosaism," and the second of "Christianity" (1870); the "Golden Gate" (1869–'70); and "Legends of the Patriarchs and Prophets" (1871).

BARIUM, one of the metallic elements. The mineral known as heavy spar was first mentioned in 1602 by an Italian cobbler of Bologna, Vincenzio Cascariolo, who discovered that when this mineral was fused with resin and charcoal it became phosphorescent. The Bologna phosphorescing stone, or *lapis solaris*, soon became famous all over Europe, and marvellous cures were sometimes attributed to it. The true composition of the heavy spar was not known till 1760, when Marggraf showed that it contained sulphur. That the mineral contained an earth was first made known by Scheele and Gahn in 1774. Berzelius, and almost simultaneously Pontin and Davy, obtained in 1808 an amalgam of barium, which

Davy subsequently decomposed by distillation and thus isolated the metal. More recently Bunsen and Matthiessen have prepared barium from the fused chloride by means of electrolysis. Bergman introduced the word heavy spar, *terra ponderosa*, and Guyton de Morveau substituted the Greek *βαρύς*, heavy, from which he derived the word *barote*, which was afterward changed to baryta, while the metal was called barium.—For the preparation of barium, anhydrous chloride of barium is mixed with sal ammoniac and fused in a Hessian crucible. A small porcelain crucible is then filled with the fused mass, and so attached to the poles of a battery of six Bunsen's cups as to be readily decomposed when brought to a state of fusion. The barium is obtained in a fine brass-yellow powder, which must be stored under naphtha, as it oxidizes rapidly in the air and decomposes water at all temperatures. Alloys of barium with bismuth, tin, and aluminum have been prepared; they are crystalline, and decompose water at all temperatures, but have no application in the arts. The compounds of barium are numerous, and have extensive use in medicine, chemistry, and technology. The oxide has been employed as a substitute for lime in the manufacture of glass, also to prevent the fermentation of the molasses of sugar cane. The binoxide has been proposed as an agent for the manufacture of oxygen from the atmosphere. If the protoxide be heated in a tube and a current of air be passed over it, it absorbs oxygen, which it again gives up on raising the temperature. It was at one time thought that the process could be made continuous, but experience has shown that the baryta melts and refuses to take up more oxygen. This can in a measure be prevented by previously mixing it with manganese dioxide and soda. By adding concentrated sulphuric acid to the binoxide of barium and gently warming, oxygen gas in the form of ozone is liberated.—As the native sulphate of baryta is generally too impure to be used directly in the arts, it is fused with charcoal and resin or oil, and the pure white sulphate obtained from the dissolved residue by the addition of sulphuric acid. Thus prepared, sulphate of baryta is used as a permanent white, under the name of *blanc fixe*, in the manufacture of paper, as a white pigment, and to adulterate white lead. As the specific gravity of heavy spar ranges from 4·3 to 4·7, it is frequently mistaken for the ore of copper or lead. Blanc fixe hardens when mixed with soluble glass, and is therefore capable of use in fresco painting. It is also used in making brilliant white satin paper.—Chloride of barium can be readily made by dissolving the native carbonate in hydrochloric acid. It is a valuable reagent in the laboratory for the detection of sulphuric acid, and in medicine as a remedy in scrofulous complaints. Several cases of poisoning by means of this agent are on record. The chloride and the oxalate are manufactured into anti-incrustation powders. A very good blasting powder is made of the nitrate of baryta, which, being much cheaper than the ordinary nitre powder, has long been employed in mines and on public works in Europe. It is not considered so dangerous as common powder, and, although slow in action, is found to be effective enough for all practical purposes.—Baryta salts are used in Belgium in the preparation of citric acid, tartaric acid, and hydrocyanic acid. In the manufacture of alum it has been found that the aluminate of baryta can be very readily prepared by fusion, from which alumina salts can be easily separated. This method is employed in France, in making alum from bauxite. Prussian blue, made from potash salts, can be prepared in a ready and cheap way through the intervention of cyanide of barium. Chromic acid is more cheaply prepared by the aid of baryta than in any other way. Stearic acid, from which adamantine candles are made, can be combined with and afterward easily separated from this substance. Baryta is also used in the preparation of starch sirup, so frequently sold as liquid honey; spirits of hartshorn or ammonia; a beautiful yellow paint, often employed as a substitute for chrome yellow, on account of its delicacy of tone and cheapness; soap, and an infinite number of other substances. Some of the best English plate glass has been made by substituting carbonate of baryta for carbonate of soda. It is a clear crystal sheet, and not liable to atmospheric changes. This glass has also been found to be admirably adapted for optical instruments. The soluble salts of baryta are poisons, the readiest antidote being sulphate of soda or magnesia.

BARK, the outer covering of trees and plants. It is found in its complete form only in the exogenous and gymnospermous classes, in which it consists of three portions, often quite distinct, but generally closely blended: the liber or inner bark (*endophlœum*), the cellular tissue or green layer (*mesophlœum*), and the corky envelope (*epiphlœum*). The liber, or fibrous bark, consists of bast cells, long, with thick walls, formed of cellulose; liber cells, thin-walled, of ordinary parenchyma, marked with reticulated spots, and seldom if ever absent from the liber; and laticiferous tubes, containing various secretions. The cellular envelope, which usually disappears after the second year, is formed of loose parenchyma, giving the bark its green color. The suber, or corky envelope, consists of cork, formed of parenchymous cells with thin walls and rectangular section, soon dead and empty; and periderme, of flat, thick-walled cells united in layers. The epidermis or outer skin is not permanent, but breaks away as the layers beneath it expand. The bark serves as a channel through which the sap elaborated by the leaves descends to feed the cambium layer, with which the bark is continuous, and by which it grows in annual rings, as does the wood itself. The medullary rays also con-

nect the bark and wood and afford channels for the deposit of the solid contents of the wood cells. From this it follows that while the youngest part of the wood is on the outside, the youngest part of the bark is on the inside; and when the newly formed cells are gorged with sap in the spring the bark may be readily separated from the wood; the newly formed cells are also the first to decay in the dead wood. The course of the sap is seen by cutting horizontally through the bark, when the upper edge of the cut will be moistened with the oozing sap, while the lower is nearly dry. Cutting off entirely the circulation of sap, as in girdling, destroys the tree. Bark may be reduced to extreme thinness, as in the grape vine, which sheds its liber annually, or be very thick, as in the *sequoia gigantea*, where it attains a thickness of two feet. The fibres, usually called bast (see BAST), are sometimes wanting, and are sometimes found in the woody portion of the stem. When present they are frequently limited to the young plant. They are of use when tenacious for cordage, many barks well supplying the place of ropes even in the construction of bridges. The leatherwood (*dirca palustris*), and the inner bark of the white cedar, are used in this country in place of hempen cordage, and the fibres may be soaked and felted into a cloth or paper, as in the tapa of the Pacific islanders. In the West Indies a remarkably tough bark called *mihagua* is in general use for a great variety of purposes, and the hibiscus fibres are well known throughout the tropics. The corky envelope occurs on many trees, but attains a remarkable thickness on certain species of the oak. (See CORK.) Bark contains many of the secretions of the sap, and thus has many economic uses as a reservoir of vegetable products. The Peruvian bark (see CINCHONA) is the source of quinine; the Angostura bark (*galipea officinalis*), canella bark (from *C. alba*), cascarilla (*croton cascarilla*), and other species, are well known drugs. Cinnamon is the bark of *cinnamomum Ceylonicum*, a lauraceous tree, native of Ceylon. Quercitron bark is the yellow dyestuff of *quercus tinctoria*. From the tannin which barks contain, especially oak and hemlock barks, arises their importance in the making of leather.

BARKER, Fordyce, M. D., an American physician, born in Wilton, Maine, May 2, 1819. He graduated at Bowdoin college in 1837, studied medicine at Harvard university, Edinburgh, and Paris, taking his degree at Paris in 1844. In 1845 he commenced practice at Norwich, Conn., and became professor of midwifery in Bowdoin college. In 1850 he became professor of midwifery in the New York medical college, and in 1856 he was elected president of the New York state medical society, and in 1860 was chosen professor of clinical midwifery and diseases of women in Bellevue hospital medical college. He is the author of a work on puerperal diseases (1872).

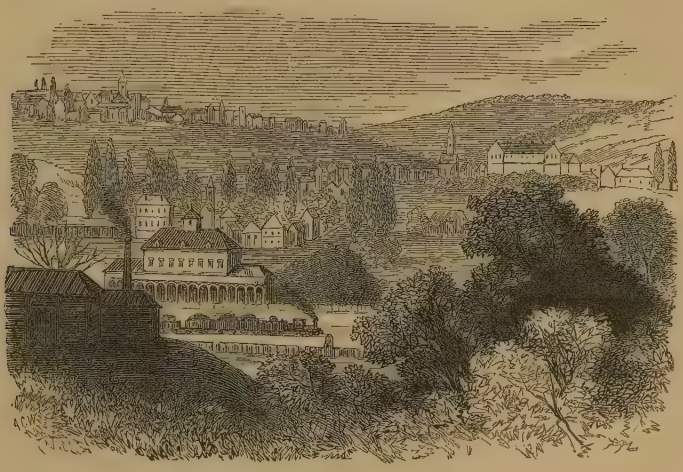
BARKER, Jacob, an American financier, born at Swan Island, Kennebec county, Maine, Dec. 7, 1779, died in Philadelphia, Dec. 26, 1871. He was of a Quaker family of Nantucket, and connected on the mother's side with Franklin. At the age of 16 he went to New York, where he got employment with Isaac Hicks, a commission merchant, began to trade on his own account in a small way, and before his majority was in possession of four ships and a brig, and had his notes regularly discounted at the United States bank. In 1801 he lost nearly all his fortune by a series of mishaps in business. Not long afterward, however, he entered into a contract with the government for the supply of oil, and again accumulated considerable wealth. He received the consignment of the first steam engine used on the Hudson river. The war of 1812 coming on, he took the democratic side in politics, engaged to raise a loan of $5,000,000 for the government, was one of the building committee of Tammany hall, and took part in the first meeting held in it. He became senator of the state of New York, and when sitting in the court of errors he delivered an opinion in opposition to that of Chancellor Kent, in an insurance case, in which he was sustained by the court. He soon afterward established the "Union" newspaper to advocate the election of Gov. Clinton. In 1815 he founded the Exchange bank in Wall street, and began to speculate in stocks. The bank broke in 1819, but he made use of other institutions chartered in different states, and for many years, by the extent of his operations, was thought to have the control of great capital. In the extensive transactions in which he now engaged, he came into frequent and violent collision with other capitalists, and called forth much opposition. On the failure of the life and fire insurance company, he was indicted, with others, for conspiracy to defraud, and defended himself in person with great ability. At the first trial the jury disagreed; on the second he was convicted, but a new trial was granted. After the third the indictment was quashed. In 1834 he removed to New Orleans, where he studied law and was admitted to the bar, after being unsuccessful on his first examination. Here he took a prominent part in politics and business, and had again accumulated a fortune when the civil war began. By this he was so impoverished that in 1867 he was in bankruptcy, and he ended his career in comparative poverty.

BARKING, a market town and parish of Essex, England, 6 m. E. of London; pop. of the town in 1871, 6,574. It is on a navigable creek near the Thames, and is inhabited chiefly by fishermen, bargemen, and market carriers. Barking abbey, one of the oldest and richest nunneries in England, was founded about 677. In 870 it was burnt to the ground and the nuns were killed or dispersed by the Danes. In the 10th century it was restored by King Edgar. Several queens of England and other noble

ladies were among its abbesses. The abbess of Barking was one of the four persons who were baronesses *ex officio*. Under Henry VIII. it was suppressed and the abbess and nuns were pensioned, and Charles I. sold the estate. Hardly a vestige of the building remains.

BARLÆUS, Gaspar. See BAERLE.

BAR-LE-DUC, or **Bar-sur-Ornain,** the capital of the department of Meuse, France, and in the middle ages of the duchy of Bar, on the



Bar-le-Duc.

Ornain, 125 m. E. of Paris, on the railway from Paris to Strasburg, and the canal from the Marne to the Rhine; pop. in 1866, 15,334. The old town was anciently fortified, with a strong castle of the dukes of Lorraine, the ruins of which are yet to be seen, and had some historical importance, being the capital of the duchy of Bar, and the birthplace of Francis, duke of Guise, surnamed *le Balafré*, of Marshal Oudinot, and Gen. Excelmans. It contains some old public buildings; in one of the churches is the celebrated monument of René de Châlons, prince of Orange, by Richier, pupil of Michel Angelo. The new town, which stands lower on the river bank, has establishments for manufacturing cotton stuffs, handkerchiefs, hosiery, hats, and jewelry, with tanneries. Its preserved fruits, and especially its *confitures de groseilles*, are highly esteemed, as well as its sparkling wine. The Ornain being navigable from the town, it has a considerable trade in forwarding timber, wine, and other articles for the supply of Paris.

BARLETTA, a walled town and seaport of S. Italy, in the province of Terra di Bari, on the Adriatic, 33 m. N. W. of Bari; pop. in 1872, 28,163. It has wide streets, a colossal bronze statue supposed to be of the emperor Heraclius, and a Gothic cathedral in which Ferdinand I. of Aragon was crowned. There is a good harbor, partly artificial, and considerable commerce is carried on with Greece and the Ionian Islands. Barletta is supposed to occupy the site of a Greek town called Barduli. While it was besieged by the French in 1503, a combat was fought by challenge between 13 French and 13 Italian cavaliers, respectively under Bayard and Prospero Colonna. At the first collision seven of the French knights were unhorsed, but Bayard and his remaining comrades fought with such skill that the tournament ended as a drawn battle.

BARLETTA, Gabriello, an Italian preacher, born at Barletta, lived in the second half of the 15th century. He was a Benedictine monk, and rendered himself very famous both by his eloquence and eccentricity. He had a habit of inserting between the clauses of the liturgy practical comments and sharp personal illustrations. Though his style of preaching was not in good taste, it was very effective, and the esteem in which he was held was expressed by the proverb, *Nescit prædicare, qui nescit barlettare*. A collection of his sermons passed through about 20 editions.

BARLEY (*hordeum*), a grain more widely distributed and generally used than any other, and from the most remote times an important article of the food of man. Pliny speaks of it as the first grain cultivated for nourishment. It is adapted to hot and cold climates, in the for-

Hordeum vulgare. Hordeum hexastichum.

mer being obtained in two successive crops in a season. Where it originated is not known, but the plant grows wild in Sicily and the in-

terior of Asia, and the common species is stated by Pursh to occur apparently wild in some parts of the United States. The barley cultivated in this country is of two species, *H. vulgare* and *H. distichum*, the grains of the former being arranged in four rows, and of the latter in two. A third species is cultivated in Europe, *H. hexastichum*, also called the autumn and winter barley. This has six rows of grains, each row terminating in a long beard. This is always sown in the fall, and ripens the first in the summer. Its grains are small, but the yield is large —sometimes 20 for 1. The Scotch bere or bigg is of this species. *H. distichum*, or English barley, originally from Tartary, has no grain beard, is more productive than the other kinds, and succeeds in almost all soils. The grain is excellent feed for cattle and barnyard stock. The crop in Great Britain is from 28 to 40 bushels to the acre, the weight of the bushel being from 50 to 54 lbs., according to the quality of the grain. The total production of barley in the United States in 1870 was 15,825,898 bushels. In California it is next to wheat the most important grain crop, sometimes yielding largely for five successive years without renewed sowing; its production in 1870 was 4,415,426 bushels. The next largest crop was in New York, 4,186,668 bushels; then follow Ohio, 1,663,868; Illinois, 1,036,338; Maine, 802,108; Wisconsin, 707,307; and Pennsylvania, 530,714. In most of the other states, especially of the south, the production is small.—Barley hulled and ground makes a coarse, heavy kind of bread, and is very extensively employed in the manufacture of beer, and to some extent for medicinal purposes. Barley corns are of an oval, elongated shape, pointed at one end and obtuse at the other, and marked with a longitudinal furrow. Their color externally is yellowish, but within they are white. Stripped of their outer covering or husk, and rounded and polished in a mill, the grains are pearly white, and are then known as pearl barley. This is the form in which they are always kept by druggists. Barley flour analyzed by Einhoff was found to contain, in 1,000 parts, starch, 720 parts; sugar, 56; mucilage, 50; gluten, 36·6; vegetable albumen, 12·3; water, 100; phosphate of lime, 2·5; and fibrous or woody matter, 68. The quality of the grain is judged of by the quantity of water it absorbs when steeped in it; 100 lbs. of good barley gain by absorption 47 lbs. of water.—From the times of Hippocrates and Galen, barley drinks have been in high repute in febrile and inflammatory complaints. They possess mild, soothing qualities, while at the same time they impart nourishment.

Hordeum distichum.

BARLOW, Joel, an American poet and politician, born at Reading, Conn., in 1755, died near Cracow, Poland, Dec. 22, 1812. He was educated at Dartmouth and Yale colleges, and during his latter vacations took part in the opening scenes of the revolution, fighting valiantly, it is said, in the battle at White Plains. At his graduation in 1778 he read a poem upon the prospect of peace, which, with another poem delivered on occasion of taking his master's degree, was published in the Litchfield collection of American poems. He began the study of law upon leaving college, but the army being at that time deficient in chaplains, he was persuaded to study theology, and after six weeks' preparation was licensed a Congregational minister, and joined the army, where he inspired the troops not only by his preaching but by patriotic songs and speeches. At the close of the war he resumed the study of law, and settled in Hartford, where he established a weekly newspaper, and prosecuted his poetical designs, adapting Watts's versions of the Psalms of David to the use of the general association of Connecticut, and adding to the collection several original hymns. His "Vision of Columbus" was published by subscription in 1787, received with favor, and reprinted in London and in Paris. In 1788 he went to England as agent of a land company, but learning that he had become associated with a party of swindlers, he resigned his office, repaired to Paris, and involved himself in revolutionary schemes. In 1791 he published in London the first part of his "Advice to the Privileged Orders," a vehement production, which was soon followed by a poem upon the "Conspiracy of Kings." The poem was suggested by the first continental alliance against France, and was introduced by a prose preface violently denouncing Mr. Burke as the author of the calamities of the time. He published a translation of Volney's "Ruins, or Reflections on the Revolutions of Empires," and in 1792 sent a letter to the national convention of France, in which he recommended an extremely popular government. He became associated with the constitutional reformers of England, and was at the same time one of a commission sent by France to organize the newly acquired territory of Savoy. At Chambéry he wrote an enthusiastic exhortation to the people of Piedmont to adopt the revolutionary principles of France, and there he wrote his humorous and most popular poem upon "Hasty Pudding." He made a fortune in France by commercial speculations, and after addressing two extravagant political letters to the people of the United States, he returned in 1805 and established himself in Washington. In 1806 he propounded a scheme

for a national academy under the patronage of government, and the next year his "Columbiad," the fruit of the labor of half his life, appeared in a style which made it the most costly publication that had yet been attempted in America, being illustrated by engravings executed by the best artists of London. A more elaborate and declamatory poem than his "Vision of Columbus," it yet never attained to the popularity of the latter. In its design it was simply a historical view of events from the time of Columbus to the scenes of the revolution, the great discoverer being represented as seeing them from his prison in Spain. In his latter years he was collecting materials for a history of the United States, and in 1811 was appointed by President Madison minister to France. His diplomatic skill was there in request, and Napoleon, perplexed by negotiations at the time of his Russian campaign, sent for him to meet him at Wilna. Barlow set off immediately, but died at a cottage in Poland before accomplishing his mission. His last poem, dictated from his deathbed, was a powerful expression of resentment against Napoleon for the hopes which he had disappointed.

BARLOW, or **Barlowe, William,** an English theologian, died Dec. 10, 1569. Before the reformation he belonged to the order of St. Augustine, was elected prior of the house at Bisham in Berks, and in 1535 was sent by Henry VIII. on an embassy to Scotland. Securing the favor of the king, he was successively appointed to the bishoprics of St. Asaph, of St. Davids, and of Bath and Wells. He formally left the Roman Catholic church, and married, and during the reign of Edward VI. he was distinguished for his Protestant zeal. Under Mary he lost his bishopric, and for a time his liberty, and retired to Germany till the accession of Elizabeth. In 1559 he was made bishop of Chichester, and continued in this see till his death. He left a work entitled "Cosmography," and several slight controversial treatises. He had a numerous family, and his five daughters all became the wives of bishops.

BARMECIDES (descendants of Barmek), a powerful family of Khorasan, attached to the Abbasside caliphs. One of them, Khaled ben Barmek, was tutor of Haroun al-Rashid. His son Yahya became the vizier of Haroun about 786, and contributed greatly to the renown of his master's reign. Of his sons, Fadhl was distinguished as a soldier and as minister of justice, and Jaffar figures in the "Arabian Nights" as the friend and confidant of Haroun. At the same time some 25 members of the family held important civil and military dignities. The downfall of the Barmecides took place about 803. Haroun, becoming jealous of the popularity and power of the family, and incensed, it is said, on account of the birth of a son of his sister Abassa, whom he had married to Jaffar on condition that the union should be merely platonic, caused Jaffar to be beheaded at Anbar, on the Euphrates; Yahya and Fadhl were thrown into prison at Racca, where they died in chains, while nearly all their relatives were arrested and deprived of their property. Ibn Khaldun disputes the truth of this story, which in modern times has afforded a theme to poets and dramatists. To one of the Barmecides is attributed the famous feast in the "Arabian Nights," where the guest was served with only imaginary viands; whence the phrase "Barmecide feast."

BARMEN, an industrial town in Rhenish Prussia, closely adjoining Elberfeld, and 24 m. N. N. E. of Cologne. It is situated in the valley of the Wupper, and stretches along the Bergisch-Märkische railway over a distance of about 9 m. to the frontier of Westphalia. It is divided into Upper, Middle, and Lower Barmen, each of which consists of a number of small towns or villages which were formerly independent, and which even now, though all absorbed into the town of Barmen, retain their old names. In 1706 the population of the valley was only 2,500; in 1861 it was 49,740; and in 1871 it had risen to 74,496. The ribbon manufacture is the most important in Europe; and cottons, velvets, silks, chemical products, plated ware, &c., are produced. There is a gymnasium; also a seminary of foreign missions belonging to the Rhenish Westphalian missionary society.

BARNABAS, Epistle of, a work purporting to be written by St. Barnabas. It was known early in the Christian church, for it is cited several times by Clement of Alexandria and Origen, and mentioned by Eusebius and Jerome. For several centuries it was lost sight of, until Sirmond in the 17th century discovered it at the end of a manuscript of one of the epistles of Polycarp. About the same time Hugo Menardus discovered a Latin version of it in the abbey of Corvey. This was printed at Paris in 1645. The year before Archbishop Usher had received a copy of the MS., which he annexed to the Ignatian epistles; but a fire at Oxford destroyed all but a few pages. The work, both in Greek and in the Latin version, has been several times reprinted; among others, by Vossius in his "Ignatian Epistles" (1646); Russell, "Apostolic Fathers" (1746); Hefele, *Patrum Apostolicorum Opera* (1842). It has been translated into English by Wake, and several times into German. All these editions are from Sirmond's Greek text, in which were wanting the first four chapters and a part of the fifth, and from the Corvey Latin version, where the last five chapters were lacking. But in 1859 Tischendorf brought from Mt. Sinai a Greek MS. of the entire epistle, divided into 21 chapters, which was published in his *Novum Testamentum Sinaiticum* (2d ed., Leipsic, 1863). The best separate edition of the epistle is that of Hilgenfeld, with the ancient Latin version, notes, and a commentary (Leipsic, 1865). An English version, from the *Codex Sinaiticus*, appeared in the "Journal of Sacred Literature," October, 1863; reprinted in the

"American Presbyterian Review," January and July, 1864. A commentary on the epistle, by J. G. Müller, has been published as an appendix to De Wette's *Exegetisches Handbuch zum Neuen Testament* (Leipsic, 1869).—Many eminent critics, as Voss, Pearson, Wake, Lardner, Gieseler, Black, and others, hold that this epistle was written by Barnabas, the companion of Paul; but the current of recent opinion is against its authenticity. Among the objections urged against it are: 1. It speaks of the destruction of Jerusalem, and must therefore have been written after A. D. 70; whereas there is reason to believe that Barnabas was not living in 64, the earliest date assignable for the martyrdom of Paul. 2. The work bears internal evidence of having been written by a gentile, with no sympathy for the Hebrews. 3. Barnabas was a Levite, and presumably well acquainted with the Hebrew ritual, which the writer of the epistle in many places misrepresents. 4. His mode of interpretation is puerile and absurd. 5. He shows himself wholly unacquainted with the Hebrew Scriptures, and commits the blunder of representing Abraham as familiar with the Greek alphabet, which did not exist until centuries after his death. The most probable opinion is that it existed in the Alexandrian church at a very early period, and was written by some one who had studied Philo and adopted his allegorical mode of interpreting the Old Testament. Some critics put the probable time of its composition just after the destruction of Jerusalem; none judge it to be later than A. D. 120.

BARNABAS, Saint, a Christian teacher, noted for his early connection with the apostle Paul. His original name was Joses or Joseph. The surname Barnabas (Gr. Βαρνάβας, from Chald. *Bar-nebuah*), signifies "son of prophecy," or "son of exhortation" (*υἱὸς παρακλήσεως*, Acts iv. 36). He was born in Cyprus of Jewish parents, and possessed of property, which he sold, giving the proceeds to the common Christian fund. As this occurred soon after the day of Pentecost, he must have been one of the earliest converts. When the tidings reached Jerusalem of the conversion of Saul, Barnabas was sent to Antioch, where a gentile church had been organized, to investigate the matter. He labored there with Paul for a year, and when a contribution was raised for the poor brethren of Jerusalem, it was sent up by Barnabas and Paul. They were soon despatched on a mission to Cyprus and Asia Minor. A controversy having arisen at Antioch respecting the obligation of gentiles to receive the rite of circumcision, they were deputed to lay the matter before the elders of Jerusalem. Their representations induced the elders to decide, notwithstanding the opposition of Peter, that the rite was not essential. Barnabas and Paul then proposed another missionary journey. Barnabas wished to take with them his nephew Mark. Paul objected to this, for some reason not assigned; but as Mark is afterward spoken of as the special companion of Peter, it may be that he had sided with him in the controversy about circumcision. The dispute became so sharp that a separation took place, Barnabas and Mark going to Cyprus, while Paul, taking with him Silas, went through Syria and Cilicia. Beyond this, with the exception of three incidental allusions in the epistles of Paul, nothing is certainly known respecting Barnabas. From these it appears that he was unmarried, and supported himself, like Paul, by some manual occupation; and that he so far went over to the Judaizing party as for a time to keep aloof from communion with the gentile converts. From the fact that the heathen of Lystra called him Jupiter, while they styled Paul Mercury on account of his eloquence, it has been inferred that Barnabas was a man of imposing aspect and demeanor. There are numerous legends respecting him, none of which can be traced beyond the 6th century. According to one, he attempted to preach in the synagogue at Salamis, was dragged out and stoned to death, and an ineffectual attempt was made to burn his body. Mark rescued the body and buried it in a cave; but a persecution arising, the Christians were dispersed, and the knowledge of the place of interment was lost. Four centuries later a heretical attempt was made to set aside the orthodox bishop of Salamis. Barnabas three times appeared to the bishop in a vision, and told him where his body might be found, with a copy of Matthew's Gospel lying upon it. Search was made, and the body and book were found. A tradition wholly unsupported makes Barnabas the first bishop of Milan; but Ambrose does not mention him among the bishops who had preceded him in that see. The Roman Catholic church celebrates the festival of St. Barnabas on June 11. The church at Toulouse claims to possess his body, and there are eight or nine other churches which claim to possess his head. A spurious gospel attributed to Barnabas exists in Arabic, which has been translated into English, Spanish, and Italian. It appears to be a forgery by some heretical sect, with interpolations by Mohammedans. It was placed among the apocryphal books by Cotelerius in his edition of the "Apostolic Canon," and was formally condemned by Pope Gelasius II. in 1118.

BARNABITES, or **Regular Clerks of St. Paul,** a religious order, so called from the church of St. Barnabas in Milan, which was granted them in 1545. The order consists of two branches, formerly distinct, but united into one during the time of St. Charles Borromeo. The origin of the older branch, who were properly called Ambrosians, is uncertain, but is supposed to date from the pontificate of Gregory XI. (1370–'78). The younger branch was founded in 1532 by three priests, Zaccaria of Cremona, and Ferrari and Morigia of Milan, for the purpose of preaching and administering the sacraments among the populace of Milan, who had become

much corrupted by the continual presence of a multitude of German soldiers in the city, and who were also much afflicted by pestilence. In 1579 their constitutions and rules were fully revised and established, under the direction of St. Charles Borromeo. The mother house is at present in Rome, and the order has about 20 colleges in Italy, Austria, and France.

BARNACLE, a name commonly given both to the pedunculated and sessile cirripeds. By the older naturalists they were classed with the testaceous mollusca, the pedunculated forming the genus *lepas*, and the sessile the genus *balanus;* they are now recognized as belonging to the *articulata*. Those provided with the fleshy peduncle or footstalk, as well as those without it, are found firmly fixed below the level of the water to the surface of rocks, shells, and floating substances. Adhering to the bottoms of vessels, they are carried to almost all parts of the world and are found in all seas, even the

Goose Barnacles on a bottle.

Arctic ocean. In warm climates particularly the barnacles attach themselves in such numbers to the bottom of vessels, especially of those not protected by copper, as often to retard their progress. Their bodies are enclosed in shells, white or of a purplish blue color; the peduncle is a fleshy worm-like stem, the extremity of which is fixed to the object upon which the animal is stationed. The food of the barnacles consists of small crustacea and mollusks; these are entangled by the many-jointed cirri which are perpetually thrown out and folded again, so as to serve the purpose of casting a net, which drags the prey to the mouth. The young are produced from eggs, which are discharged by the female in great numbers. On emerging from the egg they are quite free, possessing locomotive organs, and being furnished also with large lateral eyes. In due time a metamorphosis takes place, and, assuming the shapes and habits of their parents, they affix themselves to their future permanent place of residence. It would appear that the growth of these animals is very rapid, for a ship perfectly free of them will return after a short voyage covered with them below the water line. The flesh of some of the varieties of the barnacle was esteemed by the ancients, and at the present day the Chinese eat it. Except as to the obstruction of vessels, they seem to be perfectly harmless.—The barnacle was in ancient times supposed to produce the bird known as the barnacle goose. (See Goose.) It is from this fabulous connection with the goose that the generic name *anatifa* of Lamarck (Lat. *anas*, duck) is still retained for the true barnacles, those furnished with the footstalk; and so of the name *anserifera* or goose barnacle of Linnæus applied to one of the species of this genus, which is called *lepas*. (See Cirripedes.)

BARNARD, Frederick Augustus Porter, LL. D., an American scholar and educator, born at Sheffield, Mass., in 1809. He graduated at Yale college in 1828, became tutor there in 1829, in 1831 teacher in the asylum for the deaf and dumb at Hartford, and in 1832 in that of New York. From 1837 to 1848 he was professor of mathematics and natural philosophy in the university of Alabama, and afterward of chemistry till 1854. The same year he took orders in the Episcopal church. He then became professor of mathematics and astronomy in the university of Mississippi, of which institution he was elected president in 1856. In 1861 Dr. Barnard left Mississippi, and in 1864 he became president of Columbia college, New York, which office he still holds (1873). He was United States commissioner to the universal exposition at Paris in 1867, and published an elaborate "Report on Machinery and Industrial Arts" (New York, 1869). His other principal works are: "Treatise on Arithmetic" (1830); "Analytic Grammar with Symbolic Illustration" (1836), originating a system still used in the principal institutions for the deaf and dumb; various reports, essays, &c., on collegiate and university education, including a volume of "Letters on Collegiate Government" (1855); "History of the United States Coast Survey" (1857); "Recent Progress of Science" (1869); and "The Metric System" (1871). In 1860 he was a member of the astronomical expedition to observe the total eclipse of the sun in Labrador; in 1862 was engaged in continuing the reduction of Gilliss's observations of the stars in the southern hemisphere; and in 1863 had charge of the publication of charts and maps of the United States coast survey. In 1860 he was elected president of the American association for the advancement of science; in 1865 of the board of experts of the American bureau of mines; and in 1872 of the American institute. In 1855 he received the degree of LL. D. from Jefferson college, Miss., and in 1859 from Yale college; in 1861 that of D. D. from the university of Missis-

sippi; and in 1872 that of doctor of literature from the regents of the university of the state of New York. He is a member of various learned societies in America and Europe, and has been a contributor to the "American Journal of Education" from its commencement, and to Silliman's "American Journal of Science and Arts" since 1837.

BARNARD, Henry, LL. D., an American scholar and educator, born in Hartford, Conn., Jan. 24, 1811. He graduated at Yale college in 1830, studied law, and was admitted to the bar in 1835. From 1837 to 1840 he was a member of the legislature of Connecticut, and labored to secure the independence of the judiciary, the improvement of county prisons, the care of the insane poor, and the reorganization of common schools. From 1838 to 1842, and again from 1850 to 1854, he was superintendent of schools, and revolutionized the construction of school houses, established public high schools, teachers' institutes, and a normal school, and improved the system of school instruction. From 1843 to 1849 he was school commissioner of Rhode Island, and by repeated visits to and public addresses in different states he aided to set on foot similar reforms elsewhere. From 1857 to 1859 he was president of the state university of Wisconsin, and in 1865–'6 of St. John's college at Annapolis, Md. He labored to improve these institutions by consolidating them with other colleges, thus increasing their resources, by establishing public high schools, and by abridging the enforced course of study to two years, and extending the range of optional studies to the modern languages and sciences. From 1867 to 1869 he was United States commissioner of education, and brought about the national recognition of the educational interests of the whole country, for which he had labored since 1840. He has received the degree of LL. D. from Harvard, Yale, and Union colleges. Among his works, several of which have passed through many editions, are: "School Architecture" (1839); "National Education" (4 vols., 1840); "Normal Schools and Teachers' Institutes" (1850); "Educational Biography" (3 vols., 1857); "Papers for Teachers" (8 vols.); "Military Schools," and "Technical and Scientific Education." He has also conducted the following educational periodicals: "Common School Journal" (1838–'42); "Rhode Island School Journal" (1845–'49); "American Journal of Education" (Hartford, 1856 *et seq.*).

BARNARD, John Gross, an American military engineer, brother of President F. A. P. Barnard, born in Berkshire county, Mass., May 19, 1815. He graduated at West Point in 1833, and was assigned to the engineer corps, in which he has since served, having been promoted as follows: lieutenant, 1833; captain, 1838; brevet major, 1848; major, 1858; brigadier general of volunteers, 1861; brevet colonel, 1862; lieutenant colonel, 1863; brevet major general of volunteers, 1864; brevet brigadier general and brevet major general of the regular army, March 13, 1865; colonel of the corps of engineers, Dec. 28, 1865. Up to 1846 he was employed as constructing engineer on the southern coasts and at New York and New Orleans. During the war with Mexico he fortified Tampico, and made surveys of the battlefields around the capital. In 1850–'51 he was chief engineer for the survey of the projected Tehuantepec railroad, and afterward acted as engineer of various public works. In 1855–'6 he was superintendent of the military academy at West Point, and for the next four years he had charge of the defences around New York. At the opening of the civil war he was intrusted with the fortifications around Washington, served as engineer for the army of the Potomac, and finally, on the staff of Gen. Grant, as chief engineer to the armies in the field. He was mustered out of the volunteer service in 1866; and, with the actual rank of colonel of the corps of engineers, he is a member of boards having in charge the fortifications and harbor and river obstructions of the territory of the United States. He has published "The Gyroscope" (1857), and "Problems in Rotary Motion" (1872), two very profound mathematical investigations; "Dangers and Defences of New York" (1859); "Notes on Seacoast Defence" (1861); "The C. S. A. and the Battle of Bull Run" (1862); and "Artillery Operations of the Army of the Potomac" (1863). In 1864 the degree of LL. D. was conferred upon him by Yale college.

BARNARD, Sir John, an English merchant, born at Reading, Berkshire, in 1685, died at Clapham, Aug. 29, 1764. His parents were Quakers, but at the age of 19 he left the sect, and was baptized into the church of England. He entered the counting-house of his father, a prosperous wine merchant, soon took the chief management of the business, became one of the most eminent traders of the metropolis, and was elected a member of parliament for the city of London, which he continued to represent during nearly 40 years. He generally opposed the administration of Sir Robert Walpole. In 1728 he was chosen an alderman of London; in 1732 was knighted, on presenting to the king a congratulatory address on his return from Germany; in 1735 discharged the duties of sheriff; and in 1737 became lord mayor. He formed a plan for reducing the national debt of England, which, deemed chimerical at first, was afterward adopted; and during the rebellion in Scotland in 1745 he assisted in maintaining public credit by agreeing with the leading merchants of London to receive the notes of the bank of England in payment of all debts. He retired from public life in 1758. A statue has been erected to him in the royal exchange.

BARNAUL, the chief town in the mining district of the Altai mountains in Siberia, lat. 53° 20′ N., lon. 84° E., on the river Barnaulka, a small branch of the Obi, 230 m. S. by W. of

Tomsk; pop. about 12,000. All the gold obtained in Siberia must be sent to Barnaul to be smelted, with the exception of that yielded by the Yablonnoi mountains. The gold-washing begins in May and lasts till September, the metal being sent to Barnaul once or twice during the year. It then passes into the control of the government, which in time accounts to the miners for its value. The silver is not separated from the gold in Siberia, but the metal is sent for that purpose to St. Petersburg. The smelting works at Barnaul are on a large scale, and are conducted in the most approved scientific manner. The governor of Tomsk, who is always chosen from the mining engineers, is required to visit every mine and smelting works at least once in two years. Exploring expeditions are sent out every spring, to prospect in the mining regions. At Barnaul there is a magnetic observatory, whence observations are regularly forwarded to St. Petersburg. There is also a museum, containing a good collection of Siberian minerals, animals, and birds. The market is well supplied. The workmen live in small wooden cottages, and nearly all the peasants own cows and horses.

BARNAVE, Antoine Pierre Joseph Marie, a French revolutionist, born at Grenoble, Oct. 22, 1761, guillotined at Paris, Nov. 29, 1793. He was educated for the law, and at the age of 22 he was chosen by the bar of Grenoble to pronounce a discourse at the closing of the parliament; his subject was the "Division of Political Powers." He distinguished himself in 1788 by a pamphlet against certain arbitrary measures of the king; and a few months after he was elected a deputy of the third estate in the states general which met at Versailles, May 4, 1789. He supported the movement for a national assembly, the formation of the national guard, the abolition of all feudal privileges, the declaration of the rights of man, the secularization of the church estates, the emancipation of the Jews, the abolition of religious orders, and the abolition of negro slavery; and opposed the absolute veto of the king, the elegibility to office of members of the national assembly, and the conferring on the king the right of making peace and war. On the last two questions he separated from Mirabeau. In October, 1790, he was made president of the assembly. On May 11, 1791, he proposed that no change should be made in regard to slavery without the consent of the planters; he was opposed by Robespierre, Sieyès, and Grégoire, and defeated. On the flight of the royal family and their arrest at Varennes, he was sent with Latour-Maubourg and Pétion to bring back the captives to Paris. From the date of this event he was totally changed. He became the advocate of the king and queen, and maintained constant relations with the latter, endeavoring to bring them into unison with the constitutional party in the assembly. He defended the inviolability of the royal person, opposed the proposition to give soldiers the right of denouncing their officers, spoke in behalf of priests who denied the authority of the assembly, and moved the order of the day on the question of the right of the assembly to dismiss the ministers. He retired to Grenoble in January, 1792, and devoted himself to political philosophy and literature until Aug. 29, when he was arrested on account of a pamphlet found in the king's cabinet. He was kept 10 months in prison at Grenoble; was transferred to Paris, Nov. 3, 1793, and was tried before the revolutionary tribunal Nov. 28, and guillotined the next day. His last words to the people about the scaffold were: "Behold the reward for all that I have done for liberty." A statue was erected to him in the senate house under the consulate, but on the restoration of the Bourbons it was removed. His works have been collected in four volumes by M. Bérenger (de la Drôme).

BARNEGAT. I. A post village of Union township, in the S. part of Ocean county, N. J. It lies on Double creek, near the inlet of that name, 1 m. from Barnegat bay. It has excellent sea bathing, and an abundance of wild fowl. **II.** A bay on the E. border of Ocean county, N. J., extends N. from below Barnegat inlet to the mouth of Metetecunk river. It is about 23 m. long, and from 1 to 4 m. wide. Metetecunk, Toms, and Forked rivers, and Kettle and Cedar creeks, discharge into it. Squan beach and Island beach, strips of sandy land from a quarter of a mile to a mile in width, separate it from the ocean. Its entrance is about a mile wide.

BARNES, Albert, an American theologian, born at Rome, N. Y., Dec. 1, 1798, died in Philadelphia, Dec. 24, 1870. He graduated at Hamilton college in 1820, intending to become a lawyer; but considering it his duty to enter the ministry, he studied at the Princeton theological seminary, and in 1823 was licensed to preach. He officiated in various churches till 1830, when, being pastor of the Presbyterian church of Morristown, N. J., he was called to the first Presbyterian church of Philadelphia, in which charge he remained till 1867, when he resigned it in consequence of failing health and the almost total loss of his eyesight. Mr. Barnes was distinguished as an eloquent preacher and faithful pastor, and was the author of many books. He is best known by his "Notes" on various parts of the Scriptures, originally prepared as lectures to his own congregation. The book of Psalms was always a favorite study, and his notes upon this are highly esteemed (new ed., 3 vols. 12mo, New York, 1868–'9). He also published notes on Job, Isaiah, and Daniel. But his reputation as a commentator rests mainly upon his notes on the New Testament, comprising the Gospels, the Acts, and all the Epistles. They are especially adapted for the use of Sunday schools and Bible classes, and have been widely adopted in the United States and in Great Britain. No other works of this class have ever had so wide a circulation. Several editions have been published, with

slight emendations; and at his death he had completed a new revision, with additions, embodying the results of the latest researches. The publication of this edition was completed in 1872 (6 vols. 12mo, New York). During the discussions which led to the temporary disruption of the Presbyterian church, Mr. Barnes was arraigned on a charge of heresy, based mainly upon some passages in his "Notes on the Epistle to the Romans." He was acquitted, but was recommended to change a few expressions which were thought liable to misconstruction; this was done, but the alteration involved no substantial variations of opinion from his earlier form of expression. When the Presbyterian church was divided, he remained with the New School branch. The degree of D. D. was repeatedly conferred upon him, but was declined. Besides his work as pastor and commentator, Mr. Barnes took a firm though moderate part in the movement against slavery in America. He also wrote largely for periodicals, and published, besides the works mentioned, an excellent introductory essay to "Butler's Analogy," "Scriptural Views of Slavery," "The Way of Salvation," "The Atonement," "Claims of Episcopacy," "Church Manual," "Lectures on the Evidences of Christianity in the Nineteenth Century," "Prayers for Family Worship," his "Defence" when on trial upon charge of heresy, several volumes of sermons, and a series of Sunday school question books.

BARNES, Thomas, an English journalist, born about 1785, died May 7, 1841. He was educated at Christ's hospital, London (where Leigh Hunt was his contemporary), and at Pembroke college, Cambridge, and after having published some powerful political letters in the "Times" newspaper, he succeeded Dr. (afterward Sir John) Stoddart in the editorship, which position he continued to occupy for nearly 25 years, finally becoming one of the proprietors. Among the best leaders from his pen was that on the character of George IV., which accompanied the obituary notice of that monarch, and a severe analysis of the character of Lord Brougham, suggested by the premature announcement of his death in 1839.

BARNES, William, an English poet and philologist, born in Dorsetshire in 1810. His family were farmers, his means of education were limited, and his philological learning was the result of study late in life. He was for a while a teacher in Dorsetshire, became curate of Whitcombe in 1847, and rector of Winterbourn Came in 1862. He is the author of "Poems in the Dorset Dialect" (1864) and "Poems of Rural Life" (1868). Among his philological and scientific works are: a "Grammar of the Dorset Dialect;" a "Philological Grammar," grounded upon English and formed from a comparison of more than 60 languages; "Tiev, or a View of the Roots and Stems of the English as a Teutonic Tongue;" "An Anglo-Saxon Dilectus;" "Views of Labor and Gold;" and a treatise on linear perspective and the projection of shadows.

BARNEVELDT, Jan Van Olden, grand pensionary of Holland, born at Amersfoort, Sept. 14, 1547, beheaded at the Hague, May 13, 1619. After studying law and divinity five years he began to practise law at the Hague in 1569, and soon became known as an able lawyer. He served in the army against the Spaniards, and was present at the siege of Haarlem in 1573. In 1585, after the death of William of Orange, he headed a deputation which offered the sovereignty of the Dutch provinces to Queen Elizabeth. The queen refused the offer, but sent a force under the earl of Leicester to their assistance. Barneveldt was soon afterward appointed advocate general or grand pensionary of Holland and West Friesland, and became leader of the republican party which favored subordinating the stadtholder to the legislature. He opposed the influence which the earl of Leicester was gaining, and in order to limit his military power had the dignity of stadtholder conferred on the young Prince Maurice, son of William of Orange. In 1603 he was one of an embassy to James I., and succeeded in obtaining the secret aid of England and France against Spain. In the religious strife between the Gomarists and Arminians, which began in 1604 and soon included all the clergy and laity of Holland, Barneveldt, who with most of the eminent scholars and statesmen of the country favored the more liberal views of the Arminians, endeavored to reconcile the two factions, now upon the point of war, by a conference of ecclesiastics, which resulted in a declaration of general toleration on the disputed points. In this the states concurred, and in 1614 an edict was issued enjoining peace. But Maurice, now Barneveldt's great rival, being at the head of the military party which had favored a prosecution of the war with Spain, while Barneveldt had in 1609 concluded a truce of 12 years, procured the summoning of the council of Dort, Nov. 13, 1618, which condemned entirely the Arminian doctrines. Barneveldt and his friend Grotius had already been arrested at the instigation of Maurice in the beginning of that year. His trial soon followed the decision of the synod, and was a mere farce, it having been already determined that he should die. He was found guilty, among other things, of "having brought the church of God into trouble," and was beheaded. As grand pensionary, which office he held until the year before his death, he conducted through peace and war the affairs of the commonwealth with great ability; and in the conflicts of religious factions he advocated the most enlightened measures of toleration and freedom. His two sons formed a plot to avenge his death by assassinating Maurice. The conspiracy being detected, one of them escaped, while the other was seized and executed.

BARNEY, Joshua, an American naval officer, born in Baltimore, July 6, 1759, died in Pitts-

burgh, Penn., Dec. 1, 1818. When the war of the revolution began he was appointed master's mate in the sloop of war Hornet, and in 1776, when scarce 17 years of age, was made lieutenant for his gallant conduct in the schooner Wasp, which captured the British brig Tender in Delaware bay. Soon after this he embarked in the Sachem, and was placed on board a captured vessel as prize master, but was captured by the Perseus of 20 guns, and exchanged. In 1777 he joined the Virginia frigate, which was taken by the British, having run aground in getting to sea. He was again exchanged, and joined a privateer which sailed in November, 1778, for France, and on her return took a valuable prize, arriving at Philadelphia in 1779. He subsequently sailed in the Saratoga, of 16 guns, Capt. Young, which fell in with the ship Charming Molly and two brigs, and took them. Barney headed the boarders thrown aboard the Molly, and was placed in one of the prizes, but on the following day all three were retaken by the Intrepid, 74. Barney remained a prisoner in England for some time, but at length escaped, and arrived in Philadelphia in March, 1782. He was appointed to the command of the Hyder Ali, a small vessel of 16 guns, and encountering off the capes of the Delaware the Gen. Monk, of 20 guns, took her after a hot fight of less than half an hour. For this the legislature of Pennsylvania presented him a sword, and he was appointed to the command of the Gen. Monk, and sailed for France in November, 1782. He returned to Philadelphia with a large sum of money lent by the French government, and the information that preliminaries of peace had been signed. In 1795 he was commissioned as captain in the French service, but gave up his command in 1800, and returned home. On the declaration of war against Great Britain in 1812, he was appointed by congress to the command of the flotilla which defended Chesapeake bay. He also took part in the battle of Bladensburg, and was severely wounded. A sword was voted to him by the corporation of Washington, and thanks by the legislature of Georgia. In 1818 he determined to emigrate to Kentucky, but on his way was taken ill and died.

BARNI, Jules Romain, a French author, born in Lille, June 1, 1818. He was for some time secretary of Victor Cousin, and since 1861 he has been professor of philosophy at the academy of Geneva. He translated the principal works of Kant into French, with critical comments and explanations (1836–'55); published several academic discourses under the title of *Les martyres de la libre pensée* (1862); and wrote *Histoire des idées morales et politiques en France au XVIII^e siècle* (2 vols., 1866).

BARNSLEY, a market town and municipal borough of Yorkshire, England, 12 m. N. of Sheffield, and 17 m. S. by E. of Leeds; pop. in 1871, 23,021. It has a spacious market place, extensive manufactures of linen, yarn, and drills, a glass factory, iron foundery, needle and wire works, dyeing and coal works. Barnsley communicates with Wakefield and Leeds by the Barnsley canal, which connects the Calder and Don. Near it are the remains of Monk Briton priory.

BARNSTABLE. I. A S.E. county of Massachusetts, consisting of the peninsula of Cape Cod and several small islands, joining Plymouth county on the N.W., bounded E. and S. by the Atlantic ocean, and S. W. by Buzzard's bay, and including Cape Cod bay; area, 290 sq. m.; pop. in 1870, 32,774. The surface is generally low and level, and there are numerous clear sandy-bottomed ponds without outlet. The soil is light, and the lower portion of the cape sandy, and in great part covered with beach grass. Cranberries are extensively cultivated in the swamp lands. The forests are chiefly of pine. Seafaring is the principal occupation of the inhabitants. The county communicates with Boston and other cities by the Cape Cod railway and its branches. It has 4 or 5 banks, 5 weekly newspapers, 184 public schools, 2 woollen mills, 2 glass works, 3 tanneries, 1 saw mill, &c. In 1865 there were 28 vessels engaged in the whale fishery, 314 in the mackerel and cod fishery, and 313 in the coastwise or carrying trade. In 1870 the county produced 2,648 bushels of rye, 12,069 of corn, 4,019 of oats, 2,065 of barley, 11,246 of potatoes, and 3,872 tons of hay. **II.** A town, port of entry, and capital of the preceding county, situated on the S. side of Barnstable bay, on the Cape Cod railroad, 65 m. S. E. of Boston; pop. in 1870, 4,793. It has a bank, a savings institution, an insurance company, a weekly newspaper, and several churches and good schools. The inhabitants are mostly employed in fisheries or in coasting.

BARNSTAPLE, a parliamentary and municipal borough, seaport, market town, and parish of Devonshire, England, on the Taw, 6 m. from its mouth in Barnstaple or Bideford harbor, on the N. W. coast, and 34 m. N. W. of Exeter; pop. of the town in 1871, 11,250. It is believed to have been founded by King Athelstan. It is well built, has an ancient church, a grammar school, where Bishop Jewell and the poet Gay were taught, a mechanics' institute, tanneries, potteries, iron founderies, paper mills, and manufactories of woollen cloths, cotton lace, and nets. The streets are well paved and lighted with gas. The weekly market held here is the principal one of North Devon, and there is also a celebrated cattle fair in September.

BARNUM, Phineas Taylor, an American speculator, born at Bethel, Conn., July 5, 1810. His father was an innkeeper and country merchant, and from the age of 13 to 18 the son was in business in various parts of Connecticut, and also in Brooklyn, N. Y. Having accumulated a small sum of money, he returned to Bethel and opened a small store. Here he was very successful, especially after adding several lottery schemes to his other sources of income. After his marriage in 1829 he became editor of

the "Herald of Freedom," published in Danbury, Conn. In 1834 he removed to New York, his property having become much reduced. Here he tried many ways to obtain a livelihood, but without success till 1835, when, hearing of Joyce Heth, a colored woman then on exhibition in Philadelphia as the reputed nurse of George Washington, he bought her for $1,000, and created some excitement by wide advertising, so that the receipts soon amounted to $1,500 a week. He now collected a small company and travelled through the country, realizing large sums. In 1836 Joyce Heth died, and a post-mortem examination proved her to have been but 75 or 80 years old, instead of 161, which was her reputed age. From 1836 to 1839 Mr. Barnum continued in the show business, but then returned to New York, again reduced to poverty. In 1841, although without a dollar of his own, he purchased the establishment known as Scudder's American Museum, and in December took possession. At the end of a year he was able to pay for it, and in 1848 he had added to it two other extensive collections besides several minor ones. In 1842 Mr. Barnum first heard of Charles S. Stratton of Bridgeport, then five years old, less than two feet high, and weighing only 16 pounds, who soon became known to the world under Mr. Barnum's direction as Gen. Tom Thumb, and was exhibited in the United States and Europe with great success. In 1849 Mr. Barnum, after much negotiation, engaged Jenny Lind to sing in America for 150 nights, at $1,000 a night. A concert company was formed to accompany her, and the gross receipts of the tour in 1850–'51 were over $700,000, upon which Mr. Barnum made a large profit. In 1855, after having been connected with many enterprises besides those named, he built a villa at Bridgeport, retired from business, and published "The Life of P. T. Barnum, written by Himself." A full autobiography under the title of "Struggles and Triumphs" (8vo, Hartford), appeared in 1869. Unfortunate investments having made him a bankrupt in the latter part of 1857, he once more took charge of his old museum, and conducted it till 1865, when it was burned. Another which he opened was also burned. Since this event he has been interested in other enterprises in New York and in a travelling exhibition of animals and curiosities, and has retrieved his losses. He was an unsuccessful republican candidate for congress in Connecticut in 1868. Mr. Barnum has frequently appeared as a public lecturer on temperance and on the practical affairs of life, and has published, in addition to the above mentioned works, "The Humbugs of the World" (12mo, New York, 1865).

BARNWELL, a S. W. county of South Carolina, bounded on the N. E. by the Edisto river, and separated from Georgia on the S. W. by the Savannah; area, 1,550 sq. m.; pop. in 1870, 35,724, of whom 22,146 were colored. Its S. portion is watered by the Big and Little Salkehatchie rivers. The surface is hilly, and the soil productive near the rivers. The chief productions in 1870 were 59,379 bushels of wheat, 781,054 of Indian corn, 70,106 of oats, 131,371 of peas and beans, 227,566 of sweet potatoes, 360,240 gallons of molasses, 24,910 bales of cotton, and 1,544,784 lbs. of rice. Capital, Barnwell Court House.

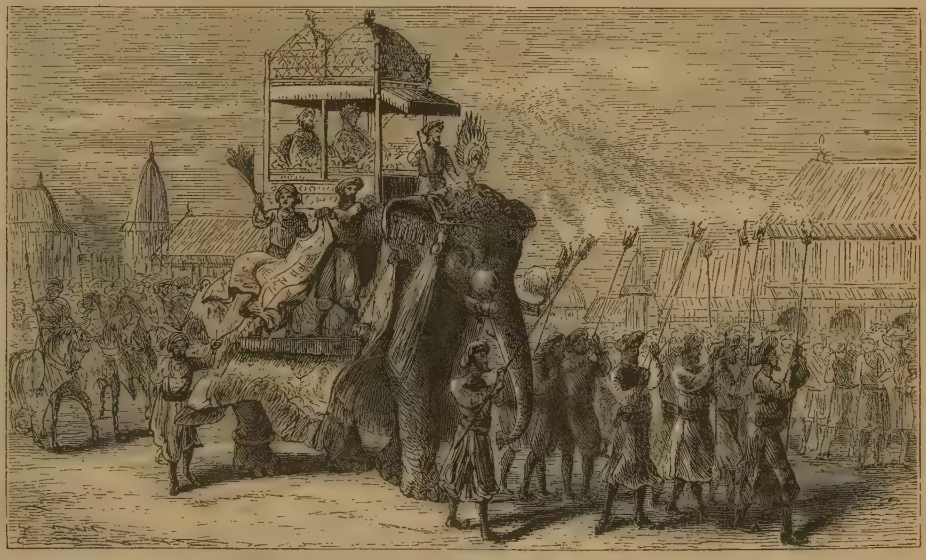
BAROCCIO, or **Barocci, Fiori Federigo,** an Italian painter, born at Urbino in 1528, died there, Sept. 31, 1612. In his youth he studied the works of Titian, and in 1549 went to Rome to see those of Raphael. In 1560 he was intrusted by Pius IV. with the decoration of the Belvedere palace, and some of the Roman painters, envious of his genius, invited him to a banquet, where they gave him poison. For four years he was not able to touch his pencil, and afterward could only work two hours a day. His later pictures are in the style of Correggio. His "Last Supper," "Descent from the Cross," "St. Francis stigmatized," "Christ and Magdalen," and "Annunciation" are among his best productions.

BAROACH. See Broach.

BAROCHE, Pierre Jules, a French statesman, born in Paris, Nov. 18, 1802. He became a lawyer, and had acquired great celebrity as an advocate—particularly as the defender of Colombier, charged with complicity in the plot to assassinate the duke d'Aumale, and Joseph Henry, indicted for an attempt upon the life of Louis Philippe—when in 1847 he was elected by the town of Rochefort to the chamber of deputies. He attached himself to the opposition, and was one of those who signed the act of impeachment presented by Odilon Barrot against the Guizot cabinet, for prohibiting the reform banquet in the 12th arrondissement of Paris. Being elected a member of the constituent assembly, he was most emphatic in his declarations of fealty to the republic, but soon leaned toward the Bonapartists. Reëlected to the legislative assembly in May, 1849, he was made by Louis Napoleon home secretary March 15, 1850, and a few days later changed this post for that of secretary for foreign affairs. He favored the *coup d'état* of Dec. 2, 1851, and on the establishment of the empire was appointed vice president of the council of state. He was also one of the privy council nominated by imperial decree of Feb. 1, 1858, for the purpose of forming a council of regency in the contingency of the emperor's death. In 1860 he was for a short time minister of foreign affairs, and in 1863 he was appointed minister of justice and public worship, retaining that office till July, 1869. Among his most important acts in this capacity were the publication of a decree forbidding the bishops to promulgate the papal syllabus in 1865, and a circular recommending the public prosecutors to observe great moderation in enforcing the new press law. He was created a senator in 1864.

BARODA. I. A district in the province of Guzerat, British India, forming the territory

of a native prince called the Guicowar, and lying between lat. 21° and 23° N. and lon. 73° and 74° E.; area, 4,400 sq. m.; pop. about 350,000. For the physical characteristics of the district, see GUZERAT. Baroda has been under the rule of the family of the Guicowars since the early part of the 18th century, before which period its history is not recorded. In 1780 the East India company made a treaty of amity with the prince then reigning, Futteh Sing Guicowar, but kept up a merely formal intercourse with him and his successors till 1802, when, a rebellion taking place in the district, the ruling Guicowar applied to the governor of Bombay for aid. From this time till 1820 a series of similar appeals and of treaties brought Baroda gradually under the protection of the British, who also became answerable for certain debts of the Guicowar. In 1828, on his failure to discharge these, the East India company sequestrated a portion of his territory; but after some years the matter was arranged, and the district nominally restored to the native rule. A strong British force is however kept in the Guicowar's dominions, and Baroda is in fact, like the other native dependencies in India, a tributary state. **II.** The capital of the preceding district, in lat. 22° 16′ N., lon. 73° 15′ E., on the Biswamintri river, which is crossed near the city by the only bridge in the province, 231 m. N. of Bombay; pop. 140,000. The fortifications of the town, though ancient, are unimportant in a military point of view. The houses are generally of wood, and have several stories. The two principal streets run at right angles to one another, crossing at the market place in the centre of the city. The palace of the Guicowar, the house of the British resident,



A State Procession at Baroda.

and the market house are the principal buildings. Baroda was formerly a very important seat of trade, and of various industries; but since 1830 its prosperity has declined, and although it still carries on a considerable commerce with the country immediately about it, it has no noteworthy manufactures.

BAROMETER (Gr. *βάρος*, weight, and *μέτρον*, a measure), an instrument used for determining the pressure of the atmosphere. The doctrine of a *plenum* in natural philosophy, and the abhorrence of nature for a vacuum, had long been too fully established in the old systems to admit the possibility of a vacuum, when Galileo, toward the close of his life, was requested to explain why water could not be raised in a suction pump more than about 32 feet. He was led to admit that nature's abhorrence of a vacuum did not exceed the pressure of a column of water 32 feet high; but subsequently, as mentioned in the last of his dialogues, he devised an experiment to ascertain the power of a vacuum. This consisted in applying weights to a piston closely fitting in a smooth tube, placed in an inverted position, to see what weight would draw it down; and previous to his death he recommended to his pupil Torricelli to continue these investigations. The decisive experiment, made by Torricelli, and called after him the Torricellian experiment, was in ascertaining the length of a column of mercury sustained by the same cause, whatever it might be, which supported the column of water. The weight of the mercury being about 14 times greater than that of the water, the height of the two columns, he reasoned, should be proportional to their weights. Filling a glass tube three

feet or more in length with mercury, and closing the open end with his finger, he introduced this by inverting the tube under the surface of mercury in a basin. On removing the finger, the mercury in the tube sank down, and after oscillating stood at about 28 inches above the surface of that in the vessel, leaving in the upper end a vacant space. (See fig. 1.) Torricelli continued his experiments, and discovered the fluctuations in the height of the column of mercury caused by the changes of the weather, and in 1645 an account of his observations was published; but he soon after died, before his great discovery was fully completed. The subject was taken up with great zeal by Pascal at Rouen in France. It occurred to him that if it were the atmospheric pressure which supported the column of mercury or water, the height of the column should be lessened as the pressure is reduced by ascending to greater elevations above the surface. He communicated his views to his brother-in-law Périer, who lived at Clermont in Auvergne, near the high conical mountain of Puy-de-Dôme, with the request that he should test the theory upon this elevation. This was not accomplished, however, till Sept. 19, 1648. Périer at this time, provided with mercury and tubes, observed in the garden of a monastery in the lowest part of Clermont the height at which the mercury stood in two tubes, which was 26 French inches and 3¾ lines. Leaving one of the barometers to be noticed in his absence, he took the other up the mountain, and at the summit found the height of the column was only 23 inches and 2 lines. At lower points, as he descended, the mercury rose in the tube, and at the base it occupied the same space in the tube as at first. This was the first observation ever made upon the different pressures of the atmosphere at different elevations. Périer repeated the experiment upon the highest tower of Clermont; and Pascal, on learning the result, made similar observations upon the top of a high house and the belfry of a church in Paris. Satisfied with the results, he soon proposed this process for determining differences of elevation. Attention began now to be directed to the variations in the height of the mercurial column caused by the atmospheric changes. Otto Guericke, an ingenious and wealthy burgomaster of Magdeburg, contrived a gigantic barometer for indicating the state of the weather. It was a glass tube nearly filled with water, 30 feet in length, placed within the wall of his house and rising above the roof, the lower end terminating in a cistern of water. In the upper part, which was of larger dimensions than the rest, was placed the figure of a man, large enough to be visible from the street. In fine weather this figure, floating upon the surface of the water, appeared in full size above the roof; but as the fluid subsided with the change of weather, the manikin withdrew into the building.—From the original invention of the barometer to the present time, the ingenuity of the most distinguished men of science has been exercised in improving its construction. Numerous modifications of its form have been contrived, and yet those now most approved are but slightly varied from the straight inverted tube of Torricelli, and the siphon tube also proposed by him. The liquid selected by him is still preferred to all others by reason of the required weight of it occupying so little space. It is also not liable to be volatilized by slight elevations of temperature, and thus fill with its vapor the vacant space in the top of the tube. The simplest form of the instrument is that called the cistern barometer. The straight tube of Torricelli terminates at its foot in a cistern of mercury. By the rising and falling of the liquid in the tube, the level of that in the cistern must change. The absolute height of the mercury, therefore, is found by rendering the scale movable, and bringing its zero point always to the surface of the mercury in the cistern; or by making the scale fixed, and bringing the mercury to its zero point by means of a screw, which is made to press against a flexible bag that forms the lower part of the cylinder, as represented in fig. 2, where the details of the upper, middle, and lower part of the barometer are shown separately. The latter method is the most generally adopted in the best instruments. By means of a sliding vernier, the scale may be read to the $\frac{1}{1000}$ of an inch. Though various contrivances have been suggested for taking the place of these minute divisions and vernier readings, no substitute has yet been found to give such good results. By a skilful observer they can be read with great minuteness, and much within the limits of accuracy of the instrument in other respects.—The barometer adopted by the Smithsonian institution is that of Mr. James Greene of New York. A full description of this, with the drawings that are required to render it intelligible, is published in the 10th annual report of the institution. In the same article are also directions for the use of the instrument, and for making barometrical observations. The instrument is designed for service as a mountain barometer as well as for stationary uses. In fig. 3 is represented the tripod serving for its support during observations when used as a mountain or travelling barom-

Fig. 1.

Fig. 2.

eter. This stand folds up as seen in fig. 4, and serves then as an envelope to protect the instrument. Mr. Green constructed also, at the suggestion of Prof. Henry, a sulphuric acid barometer for the Smithsonian institution. As this liquid is much heavier than water, the tube was only about 18 ft. long; but experience proved it to be behind the mercurial barometer in its indications, and its use was abandoned.—The siphon barometer of Gay-Lussac, improved by Bunten of Paris, is a very portable and convenient form for the use of the scientific traveller. It is represented in fig. 5. The name siphon is applied to barometers of which the lower end of the tube is turned up to form a short arm, which constitutes the cistern, and may be left open for the air to press directly upon the mercury. A capillary opening in this short arm, which is otherwise tight, answers the

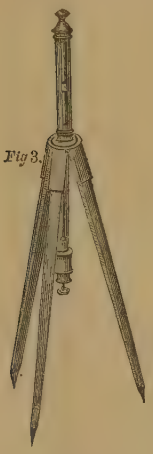


Fig 3.

Fig. 4.

same purpose as if the whole were open. The surface of the mercury in the lower arm corresponds to the zero point in the cistern barometer; and as this fluctuates as well as that of the longer limb, it is necessary to use a vernier at each extremity of the column, and take two readings in order to determine the height of the column. As the two limbs are made of precisely the same diameter, the reading of one and doubling this gives a correct result. In Gay-Lussac's barometer, the tube at each extremity is of the usual diameter, but in the elbow, and along the lower part of the long limb, it is drawn down to a very small bore. The instrument is thus made to occupy very little space, so that the glass is enclosed in a brass cylinder of the size of an ordinary cane. An open slit at each end of the brass tube affords an opportunity of reading the verniers, the indexes of which traverse up and down these openings by means of toothed wheels which run in a rack made upon the edge of the brass. The improvement introduced by Bunten is in dividing the long limb into two parts, the upper one of which is drawn down at its lower end to a small opening and inserted into the lower portion, to which it is attached, making again one tube. (See fig. 6.) The object of this conical projection of the upper into the lower part is to form a chamber or trap to catch any air which may be accidentally introduced through the short branch, and thus intercept its passage to the vacuum, where by its elasticity it would counterbalance to some extent the pressure of the external air. When the barometer is inverted, the air lodged in the air trap escapes through the short branch by which it entered.—A barometer in common use is provided with an index which turns around upon a dial, and points to figures which indicate the height of the mercury, as also to words descriptive of the state of the weather, as "Cloudy," "Fair," "Rainy," &c. The index is made to move by means of a string, which passes around its axle, and has at each end a weight attached, the larger one resting upon the surface of the mercury in the shorter limb of a siphon barometer. (See fig. 7.) This is open to the objection that the reading of one limb gives but half the actual effect; but as the length of the index is several times greater than the radius of the pulley upon its axis, this objection is really more than counterbalanced. Still, little confidence is placed in its accuracy in marking the true variations of the column, there being so much friction that slight changes do not affect it at all. The words "Fair," "Variable," "Rain," "Storm," &c., found on the barometer scales, convey an erroneous impression about this instrument to the uninstructed; for the barometer does not designate by the absolute height of the mercury, but by its rising or falling, the kind of weather we may expect, and this change is not indicated by the index.—In filling a tube with mercury, particular care is required that the mercury be free from mixtures of other metals. It is introduced into the tube in small quantities at a time, and boiled as each portion is added, the heat being applied to that part of the tube containing the mercury last introduced. By boiling the mercury in the tube *in vacuo*, the air and moisture are most effectually expelled. On inverting the tube when properly filled, its lower end being kept in a basin of mercury, the column sinks to the proper level to counterbalance the atmospheric pressure. When the operation has been successfully completed, the column of mercury presents a bright undimmed appearance, and emits flashes of electrical light in the vacuum above, on the column being made to oscillate up and down in the dark; and a perfect vacuum is indicated by the clicking sound of the mer-

Fig.6.

Fig. 7.

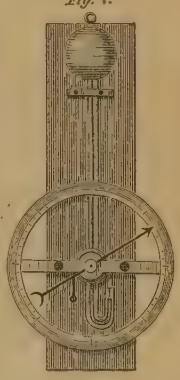


Fig.5.

cury when it is allowed to strike the top of the glass tube. Still the electrical light is supposed to be dependent on a small quantity of vapor left behind in the vacant space of the tube; but in several instances it has been observed that the mercury remains suspended in the tube when this is inverted, even if the lower end be not placed in a cistern of the metal. It is detached by a sudden jar. The adherence of the mercury to the glass tends to introduce errors in estimating the true height of the column. Instead of forming at the top of the column a concave surface by the particles adhering to the glass and climbing up its surface, as water and other fluids do by the property called capillarity, the mercury takes a convex form, and the column is lower than it should be. The smaller the bore of the tube, the greater is this depression and the error involved; but in the siphon barometer (fig. 5) the error of one convex surface of the mercury in one limb is counteracted by the same effect from that of the other.—However well constructed and filled, all barometers are liable to vary, after years of use, by a partial oxidation of the mercury, producing a thin film, which attaches itself to and obscures the inner surface of the tube. This film can be removed only by cleaning and refilling with fresh mercury. Air is liable to creep in between the mercury and the glass, and gradually enter into the vacuum, producing in the best instruments effects that are only perceived after a series of years; instruments used for a long period show a less height in the latter than in the former part of the period.—Prof. Daniell constructed the most perfect water barometer ever made, which is somewhat similar to that already noticed of Guericke at Magdeburg. It is fixed in the hall of the royal society at Somerset house. The tube is of glass, 40 ft. long and an inch in diameter. The water in it stands at an average height of 400 inches above the fluid in the cistern. A layer of a solution of caoutchouc in naphtha upon the water in the cistern prevents access of any air to the tube. The column is sensitive to continual changes of pressure in the atmosphere, which do not affect other barometers. In windy weather it is in perpetual motion, vibrating up and down almost with the regularity of respiration. It indicates the horary oscillations of the pressure sooner than does the mercurial barometer of half an inch bore.—In the use of barometers, it is often desirable to have their variations recorded without the necessity of frequently observing them. Several methods have been devised of rendering them self-registering. One method is that of Mr. Bryson of Edinburgh. Upon the mercury in the lower limb of a siphon barometer is placed an ivory float, which carries outside to the tube a knife edge. This, by proper machinery, is made to touch once every hour the surface of a vertical cylinder, which revolves with uniform motion once in 24 hours, and upon the face of which are marked spaces corresponding to the hours of the day and night. A new cylinder is used each day. The marks are made upon a coating of fine chalk and water laid on with a camel's-hair brush. Such arrangements are, however, far inferior to the photographic method now adopted in all meteorological observatories. This consists simply in a slip of sensitive photographic paper, moving by clockwork behind the upper part of the mercurial column, which throws its shadow on it, and thus prevents the impression of the light on the lower shaded portion. The light used is a kerosene lamp, and the slips of paper, after having been exposed, are darkened upon their upper half, while the undulating line between the darkened and light portion shows the variations of the barometer during the time of exposure. Account should be taken of the temperature at the same time that the observations of the barometer are noted; for the height of the column, as in the thermometer, must vary with change of temperature, as well as by change of atmospheric pressure. It is particularly important to make allowance for this cause of variation in observations for determining elevations, and a thermometer is always attached to the barometer for this use. Between the points of boiling and freezing it is found that the space occupied by mercury amounts to $\frac{1}{54}$ of its bulk. For each degree of heat by the centesimal scale its volume increases $\frac{1}{5412}$; by Fahrenheit's thermometer, $\frac{1}{9743}$. Though little reliance can be placed upon the barometer as indicating by any single observation the condition of the weather, its fluctuations caused by changes of atmospheric pressure may, when carefully noticed, often serve to foretell the effects that must still ensue. Thus, a sudden and long-continued fall is a sure sign of an impending storm. Many instances are recorded of vessels being saved by the precautions taken, in consequence of the warning of the barometer at the immediate approach of hurricanes, of which no other notice was given.—Barometers have been constructed with particular reference to use at sea. (See fig. 8.) Their tube has a bore scarcely exceeding $\frac{1}{30}$ of an inch. Its upper end terminates in a cylinder 4 or 5 inches high and nearly $\frac{2}{10}$ of an inch in diameter. It is suspended by a spring and gimbals near the top. The object of the larger bore above the capillary tube is to prevent a rapid flow of the mercury, which might be caused by the motion of the ship, and break the tube by its striking against the top. The form is liable to the objection that the rise and fall of the fluid is

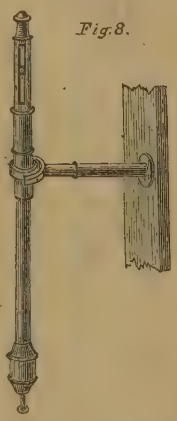
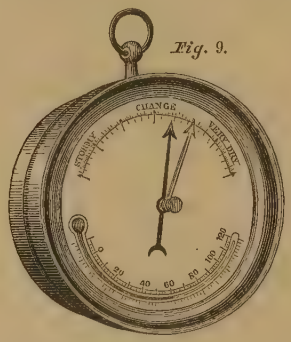


Fig. 8.

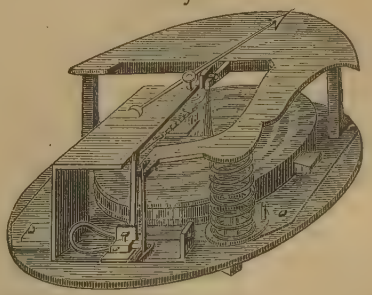
necessarily very slow, and several minutes may elapse before a sudden change of atmospheric pressure is indicated.—The cause of the shifting pressure of the atmosphere is to be looked for in the operations of the winds which may be blowing in distant localities. By drawing the air away from any point, the pressure is here to some extent taken off, producing a partial vacuum which must soon be filled by a rush of air from other sources. Where the winds are equable, like the trade winds of the tropics, the movements of the barometer partake of the same regularity. Humboldt, in his researches in the equatorial regions of South America, was greatly struck by the uniformity of the motion of the barometer in the different periods of the day. From 4 o'clock in the morning till 10 the mercury generally rises, and then falls until 4 in the afternoon. It then rises again till 10 at night, after which it falls till 4 in the morning. In temperate northern latitudes the barometer generally stands higher at 9 A. M. and 9 P. M. and lower at 3 A. M. and 3 P. M. than at other hours. Prof. Daniell recommends these hours as the best times for consulting the barometer as a weather glass. Its rise between 9 A. M. and 3 P. M. indicates fine weather. A fall from this time to 9 P. M. is likely to be followed by rain. Prof. Buys Ballot of Utrecht occupied himself for many years in making with others simultaneous observations in different localities of the changes in the barometer and in wind and weather. He determined positive numerical relations between the force of the wind and the height of the barometer preceding it. He succeeded at last in finding the laws governing the forward motion of the centre of barometric depression, followed by storms, and induced the government of Holland to establish a weather bureau with public storm signals in 1860, which was followed by England in 1861, by France in 1863, and by the United States in 1870. These laws, as might be expected, differ in different localities. From this relation rules have been deduced by which the maximum force of the wind during the day may be predicted every morning, thus enabling outward-bound vessels to determine the safety of putting to sea.—The Boiling Point Barometer is an instrument whose action depends upon the variable temperature at which water boils at different elevations, or, what is the same thing, under different atmospheric pressures. It is constructed with a small cistern for the water, arranged in a cylindrical tin tube, which contains in the lower part an alcohol lamp for heating the fluid. The temperature is best noticed by suspending the bulb of the thermometer in the partially confined steam which rises from the boiling water. The difference in the temperature observed at two different points, expressed in degrees of Fahrenheit's thermometer, being multiplied by 530, will give the approximate difference of elevation between these two points. For greater accuracy correction should be made for the difference of the temperature of the air at the two places. Although the instrument is in a very portable and convenient form, it has not proved a favorite with scientific observers, from a want of confidence in its results.—The Aneroid Barometer (Gr. *ἀ*, *νηρός*, and *εἶδος*, a form

Fig. 9.



without fluid) is a modification of the vacuum case barometer, the earliest form of which was invented by M. Conté, professor in the aërostatical school at Meudon, near Paris, and described by him in the *Bulletin des sciences*, Floréal, year 6 (1798), p. 106. M. Conté in his balloon ascents found the reading of the mercurial barometer subject to the same difficulties so much complained of on shipboard, arising from the violent oscillations of the instrument. He therefore invented a watch-like, metallic, air-tight vacuum case, the lid of which, sustained by internal springs, rose and fell under the variable pressure of the atmosphere, an index showing the motion. M. Vidi subsequently devised a case of different form, with a flat corrugated top and bottom, flanged over and soldered to a rim, first pressed together at the centre by the withdrawal of the enclosed air, and then separated a certain distance by the introduction of a compensating spring. The instrument thus improved and constructed has come into extensive use. It is represented externally by fig. 9; fig. 10 shows the interior

Fig. 10.



arrangement, while fig. 11 shows a cross section of the flexible air-tight box, which collapses when the air is withdrawn. (See fig. 12.) By means of a spring it is brought back

to its original position, the spring pulling it out again, and thus counterbalancing the atmospheric pressure, which tends to make the box collapse. A change in this pressure will of course resist the spring more or less, and this slight motion, multiplied by a proper mechanical arrangement, turns the hand seen at the top of fig. 10, and also, with the scale, in fig. 9. As, however, a rise in temperature expands the spring and diminishes its resistance, it will have the same result as an increased atmospheric pressure, namely, tend to let the box collapse. Becker, a well-known balance maker of New York, corrects this by introducing into the vacuum in the box a measured but very small quantity of perfectly dry air, the expansion of which by heat counterbalances the loss of tension of the spring by the same cause. Experience proves, however, that this kind of compensation becomes inert after a lapse of a few years; hence a correction for temperature is required, the instrument having a thermometer attached, as shown in fig. 9. Unfortunately, this correction must be found by experiment for every instrument, and changes even for the same instrument in the course of time. The coast survey and the Smithsonian institution have therefore pronounced against these barometers. Their objections, however, it is thought, do not apply to their use in the hands of practical surveyors, topographers, civil engineers, artists, travellers, and sailors, who all pronounce emphatically in their favor. The observer must however learn to know his instrument well, or he can do nothing with it on an extended survey. Of course the aneroid can be of no service in the high geodesy of a coast or ordnance survey. In civil engineering, on the contrary, up to the final location line, it is reasonable to expect that it will almost replace the spirit level. In geological examinations it is invaluable. The geologist in tracing outcrops through the woods and where the rocks are entirely concealed, across ravines, and over the shoulders of hills, in a broken country, has only to discover and take the direction of the line of strike, to know by the infallible rise or fall of the index hand to the level of the point of his departure precisely when he is passing up or down over the outcrop of his bed. In countries where the rocks are nearly or quite horizontal, in fact over half the United States, the aneroid is to the geologist a whole corps of assistants, and the work of a week can with its help often be done in a day. There is an external index to assist the memory of the house observer from one observation to another.

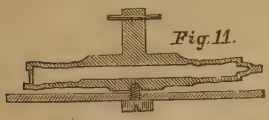


Fig. 11.

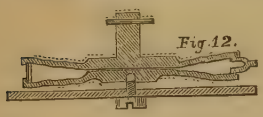


Fig. 12.

BAROMETRICAL MEASUREMENT. By the perfection now attained in the construction of barometers, and the skill applied to their use by the best observers, differences of elevation may be ascertained by them with greater accuracy than by the most carefully conducted triangulation—at least, in places where the elevations are great and difficult of access. High summits, covered with shifting clouds, involve uncertain errors, arising from constantly varying refraction; and inaccessible mountains can only be observed under very small angles from the termini of a carefully constructed base line, in some smooth district, at a considerable distance from them. A comparison of results obtained by both methods is generally in favor of the barometer. Humboldt noticed this, particularly in the numerous measurements that had been made of the peak of Teneriffe, and, in determining this elevation by the mean results of the various observations, he rejected eight out of nine geometrical measurements, and only one out of four barometrical measurements. Both modes, however, are capable in many localities of a great degree of accuracy, as is shown in the two measurements of Mt. Washington, the first by Prof. Guyot with the barometer, and the second by the officers of the coast survey, in which the difference was only 3 ft. in the height of 6,285 ft. determined by Prof. Guyot. To insure the greatest degree of accuracy, it is essential to use two good barometers, one at the lower and the other at the upper point. If only one be employed, there is a liability of error from a change of atmospheric pressure taking place during the time spent in passing from one station to the other. These barometers should have been carefully compared by many observations, and the mean of their variation noted, to be always allowed in the calculation. They should also have been compared with other barometers of known character, and their differences with these noted, and this comparison should be repeated after their use, in the same way as chronometers are compared, and their rates noted, before and after a voyage. Repeated observations should also be made at both stations at the same times, and the mean of all be taken, unless some show good reasons for their rejection. It is also important that the two stations be not very far apart. In a distance of 40 or 50 m. there may well be varying conditions of the atmosphere that cause a difference of pressure not due altogether to the difference of elevation. This cause of error may be avoided by using intermediate stations, and advancing step by step.—One point determined serves as the established base for determining the next beyond. In measuring the heights of the principal summits of the Black mountains of North Carolina, Prof. Guyot used as his starting point the level determined by a railroad survey, 7 m. distant from the nearest hill. The next station was taken half way to the summit, and by repeated observations at both, continued dur-

ing two days, the liability to error resulting from too great distance was avoided; so also was that from a faulty correction for temperature. This correction, as applied by the tables, amounts sometimes to 300 ft. But it supposes the actual temperature of the stratum of air between the two points to be represented by the mean of the temperature at the two places, and a moderate variation from this may well involve an error of $\frac{1}{10}$ or $\frac{1}{12}$ of the whole correction. Such a variation is not at all improbable where the difference of elevation is very great, as in the higher regions the decrease of temperature takes place more and more rapidly. The next station was the summit of the first hill, the height of which was ascertained by comparative observations made upon it and at the same time at the second station. The different peaks were then compared one with another by observations made upon them in pairs. So exactly were these measurements conducted by Prof. Guyot, that, as he states, his single observations differed only two or three metres from the means, and the mean of one day scarcely differed one metre (39 inches) from the mean of another. But for these precautions an error might have resulted in the determination of the first summit of 50 ft. or more, such as Prof. Guyot found he was liable to in the course of his observations at the White mountains when the two stations were from 10 to 20 m. apart. As the distance between stations increases, the number of observations should also be multiplied, in order to obtain a correct mean. The barometers are to be carefully suspended, so that the column shall be perfectly vertical, and they should be placed in a situation not subject to sudden change of temperature. The reading of the height of the mercurial column is to be taken at the same time as that of the thermometer attached to the barometer, and also of the detached thermometer. If the instrument has been suspended for some moments, the two temperatures may not differ. When these observations are compared with those made at the same time at the other station, the calculations for the difference of elevation are usually made by the aid of the tables prepared by M. Oltmanns. This is a much more simple process than calculating the difference by the theorem of Laplace, which gives the same result. If the instruments are graduated in inches, these must be turned into metres, and the temperatures must also be expressed in degrees of the centigrade thermometer. With the tables for these conversions and calculations are given very simple directions for their use, and applying the necessary corrections.—Some singular barometric anomalies are reported by Lieut. Herndon to have been observed by him in the vicinity of the Andes. At the eastern base he found the pressure, as measured by the boiling point of water, to be nearly as great as at the level of the sea. Having descended nearly 1,000 m. on the Amazon, the boiling point indicated an ascent of nearly 1,500 ft. Maury explains this by referring it to the effect of the trade winds, which strike upon the flanks of the mountains and are banked up against them, as a current of water interrupted by impediments in the channel is piled against these. By the banking of the current of air an increased pressure is supposed to be exerted upon the surface at their base.—In the earlier measurements made with the barometer the air was considered as a uniform fluid, no regard being paid to the gradual diminution of density in ascending into the higher regions; but when this gradation was taken into the calculations, it became necessary to determine the relation between the density of the air and its elastic force. Mariotte, who published his "Discourse on the Nature of Air" in 1676, and who was the first to demonstrate the law which bears his name, that the volume of a gas is in the inverse proportion to the pressure upon it, opened the culture of a new field from which rich harvests were subsequently reaped. From the suggestions afforded by this simple law he proposed to compute heights from barometrical observations by the rule usually employed in constructing tables of logarithms, seeming to have obtained some idea of the remarkable fact that the density of the atmosphere decreases in a geometrical progression corresponding to the elevations taken after an arithmetical one. But for some reason he seemed not to be aware of the importance of the great principle, and abandoned the method for another in which he repeated the bisection of a column of air between two stations into successive horizontal strata, calculating the densities according to a harmonic division.

BARON (Gallic *ber*, Gothic, *vair*, mediæval Latin *baro*, early Spanish *varon*, a man), in the middle ages, the possessor of an estate, who might have feudal tenants under him. In France the nobles in general were at first called barons, but subsequently the immediate vassals of the king received the appellation of *hauts barons*, or high barons. In Germany the early barons were the highest nobility, who afterward assumed the titles of counts and princes. In more modern times, in both France and Germany, a baron (in the latter country now generally called *Freiherr*), is a nobleman next in rank to a count. In England the original barons of the realm were those who held lands by tenure of suit and service to the king. They were bound to attend the king in war, to supply money on particular occasions, to furnish a military contingent proportioned to the extent of their fiefs, and to attend the king's courts. Various circumstances having increased the numbers of the barons holding direct from the sovereign, a practice became established about the time of Edward I. of summoning individuals by writ to the great councils. The barony by tenure and by writ being heritable, the inheritance of the titles became complicated by the devolution of the estates to female descendants,

who, though incapable of holding titles, were nevertheless capable of transmitting them. From this a practice arose of creating barons by patent, limiting the succession to heirs male. All noblemen were originally the king's barons, and *inter pares* the question of precedence was one not always easy of settlement. The creation of dignities superior to those of barons—dukes, marquises, earls, and viscounts—to which some of the greater barons were raised, settled the question in part, and the antiquity of the particular title determined the precedence among those of equal dignity. Some other persons in England, as for instance the citizens of York and London, were styled barons, whose titles were drawn perhaps from the relation of suit and service in which they stood to the crown. The judges of the court of exchequer, a court instituted immediately after the conquest, are still styled barons.

BARON AND FEME, the Norman-French term used to signify man and wife in the early English law writers. (See HUSBAND AND WIFE.)

BARONET, an English title of honor. The baronet is the next degree in point of precedence below a baron. The baron is a peer of the realm, a hereditary legislator; the baronet is a commoner. The dignity dates from James I., and according to Blackstone was instituted by that monarch in order to raise a competent sum for the reduction of the province of Ulster in Ireland, for which reason all baronets have the arms of Ulster superadded to their family coat. The candidates for the honor were required to be of gentle blood, and of adequate means to support the dignity; and it was promised that the number should not exceed 200, and that lapses by death should not be filled up. This promise, however, was soon abandoned. For similar reasons an order of baronets of Nova Scotia was created by Charles I. (See ALEXANDER, WILLIAM.)

BARONIUS, or **Baronio, Cesare,** an Italian historian, born at Sora in 1538, died in Rome in 1607. He went to Rome in 1557, and became one of the first disciples of St. Philip of Neri, founder of the congregation of the Oratory, whom he succeeded as superior in 1593. Pope Clement VIII. soon after made him his confessor, in 1596 created him cardinal, and finally appointed him librarian of the Vatican. He was twice a candidate for the papal chair, but was defeated by the Spanish party, to which he had given offence in his treatise *De Monarchia Siciliæ*, by opposing the claim of Spain to Sicily. His principal work, a history of the church, entitled *Annales Ecclesiastici a Christo nato ad annum* 1198 (12 vols., Rome, 1588–1607), written to oppose the "Magdeburg Centuries," occupied him for 30 years. It abounds in errors of various kinds, and shows a lack of critical spirit; but it is esteemed one of the most valuable repositories of church history, and a work of great learning and research. It was continued by Rinaldi and Laderchi, and annotated by Pagi; and the whole work, with the continuations, &c., was republished at Lucca in 38 vols. fol., 1737–'57. A more recent continuation, embracing the years 1572–'85, was composed by Theiner (Rome, 1856–'57). Baronius also published an edition of the *Martyrologium Romanum*, with notes (fol., Rome, 1586), but afterward endeavored to suppress it on account of errors discovered in it.

BARONY, in England, the manorial right or lordship of a baron, for which the courts baron were formerly held. In Ireland the term designates a particular territorial division existing from very ancient times, and corresponding nearly to the English hundred.

BAROTSE, a valley in the interior of S. Africa, inhabited by a tribe of the same name, lying between lat. 15° 20′ and 16° 30′ S. and lon. 23° and 24° E. It is traversed by the Zambezi river below its confluence with the Leba, and is subject to annual inundations by that river, like the valley of the Nile, to which it bears a close resemblance. The villages are built on mounds, some of which are said to be artificial, and during the inundation the country assumes the appearance of a large lake, with the villages on the mounds like islands, as in Egypt. Barotse is supposed to have once been a lake, and there is a slight tradition of the waters having burst through the low hills on the south. The soil is very fertile, and the natives are able to raise two crops a year; but there are comparatively few trees. Dr. Livingstone thought that the Barotse valley was too rich to raise wheat, and would make the corn run to straw; one species of grass was observed 12 feet high with a stem as thick as a man's thumb. The land is little cultivated, and mostly covered with coarse succulent grasses which afford ample pasturage for large herds of cattle. On the waters retiring subsequent to the inundation the gases arising from the masses of decaying vegetation are the cause of fevers from which the natives suffer severely. Other diseases are almost unknown except smallpox, which sometimes rages there. The natives, however, appear to be acquainted with inoculation. The river abounds with voracious alligators. The Barotse pray to these animals, and eat them too. They reverence the sun, and believe in a future spiritual existence. The capital of the country is Narile, with 1,000 inhabitants.

BAROZZIO DA VIGNOLA. See VIGNOLA.

BARQUISIMETO. I. A N. W. state of Venezuela, touching the Caribbean sea on the N. E.; area, 9,350 sq. m.; pop. about 314,000. The surface consists of fertile valleys, densely covered desert mountains, arid hills and barren plains, all of which afford, however, good pasturage for goats, which are reared in numbers, also for horses, mules, and asses. Cattle raising and agriculture are the chief occupations. The largest rivers are the Portuguesa, Tocuyo, and Yaracuy. The state is the most prosperous of Venezuela, and is divided into

six cantons. **II.** A city, capital of the state, on a river of the same name, 70 m. from the sea, and 155 m. W. S.W. of Carácas; pop. about 11,000. It was founded in 1552 by Juan de Villegas, who first called it Nueva Segovia. It is situated 1,719 feet above the level of the sea. A terrible earthquake in 1812 scarcely left a house standing; but the city has since been handsomely rebuilt. It is conveniently situated for commerce, as several important roads from the west converge here. There are a college, seminary, and numerous other schools. Excellent coffee and fine cacao are produced in abundance. The city was frequently occupied by the belligerents during the war of independence, and the scene of much bloodshed.

BARR, a town of Germany, in Alsace, at the foot of the Vosges mountains, and at the entrance into the picturesque Ulric valley, 18 m. S. W. of Strasburg; pop. in 1871, 5,651. It has manufactories of soap and of woollen, cotton, china, pottery, and crystal ware; it also has a brisk trade in wine, iron, wood, and cattle. The place is mentioned in the 8th century. In 1592 it was totally destroyed by the troops of the cardinal of Lorraine. Above the town rises Mount Odilia (2,521 ft.), on which St. Odilia, the daughter of Duke Attic of Alsace, established a celebrated monastery, which was sold during the French revolution.

BARR, or **Barra,** a small kingdom of W. Africa, near the mouth of the Gambia, extending along the N. bank of the river about 50 m.; pop. estimated at 200,000. This kingdom was founded by a Mandingo warrior from the interior, who overran the country, and afterward kept his hold of it by means of arms procured from Europeans in exchange for slaves. The free Mandingoes constitute only a quarter of the population, and are described as a well made, industrious, and shrewd race, all zealous Mohammedans. The remainder of the population are in slavery.

BARRA (or **BARRAY**) **ISLANDS,** a group of about 20 islands, forming a parish of the same name, on the W. coast of Scotland, belonging to the chain known as the Outer Hebrides. The principal island, from which the rest are named, is about 8 m. long, and from 2 to 4 m. wide; pop. about 1,600, chiefly Roman Catholics. It contains the ruins of several very old religious houses. At a place called Kilbar are the remains of two churches said to have been built by the monks of Icolmkill, and at various points throughout the island stand ancient watch towers. Druidical circles are found in many places, and a dun or fort, supposed to have been built by the Scandinavians, is on every lake. In the middle of a beautiful bay, on a small rock entirely covered by the tide at high water, stands the ancient castle of the Mac Neils. On Barra is the highest lighthouse in Britain, 680 ft. above the sea.

BARRACKPOOR, a town and military cantonment of Bengal, on the E. bank of the Hoogly, about 10 m. N. N. E. of Calcutta. It is a favorite retreat for the Europeans of Calcutta, and contains the country residence of the governor general. The town itself is irregularly built, most of the houses being bungalows, embosomed among lofty trees, and the country around is profusely wooded. It possesses a park of 250 acres, with a fine collection of Indian zoölogy, and a stud of elephants, maintained mainly for the recreation of the guests of the governor general. Barrackpoor is noted as the place in which the first blood was shed in the sepoy mutiny. The town was a convenient station for military operations in the eastern part of Bengal, and for any sudden emergency at Calcutta. Four native regiments, with European officers, were stationed there. Discontent had arisen among the men, who supposed that the new cartridges issued to them were greased with animal fat, and one regiment was disbanded in February, 1857. On March 29 an armed sepoy marched about, declaring that he would shoot the first European he met. He wounded a European lieutenant, and a native officer refused to arrest him. Both were afterward arrested, tried by court-martial, and executed April 5; and a few days later the regiment to which they belonged was disbanded. After the suppression of the mutiny extensive barracks were erected here for British troops.

Barrackpoor.

BARRAL, Jean Augustin, a French chemist and physician, born at Metz in 1819. After receiving his education at the polytechnic school, he became an officer of the *régie* or government tobacco monopoly. He was the first to extract nicotine from the leaf of that plant, and to demonstrate by experiment its poisonous qualities. In 1845 he was made a tutor of chemistry at the polytechnic school, and in 1851 a professor of chemistry and natural philosophy at the college of Sainte-Barbe. In 1850 he made two ascents in a balloon, which were attended with great danger, for the purpose of taking observations on the temperature, humidity, and other conditions of the atmosphere at various heights. He edited for a while the *Journal d'agriculture pratique*, and has written many treatises on the application of chemistry to agriculture, metallurgy, and the arts.

BARRAS, Paul François Jean Nicolas, count de, a French revolutionist, born at Fox-Amphoux, Provence, June 30, 1755, died at Chaillot, near Paris, Jan. 29, 1829. He served in the East Indies, in the army, returned to France with the rank of captain, wasted his fortune, and, though he had no political opinions, threw himself among the revolutionists, probably in the hope of retrieving his affairs. He took part in the attacks on the Bastile and the Tuileries, and was elected by the department of Var a member of the convention, where he voted for the death of the king, with neither delay nor appeal to the people. In October, 1793, being sent to the south of France with Fréron, he succeeded in forcing the anti-revolutionists to submission. He went alone to arrest Gen. Brunet, who was charged with having traitorously delivered Toulon into the hands of the English. Returning to that city, he hurried the siege; and when Toulon was taken, he visited the traitors with the most severe punishment. He was one of the most active in the revolution of the 9th Thermidor, and headed the troops who took Robespierre in the hôtel de ville. Next day, having resigned his command, he was appointed secretary to the convention, and in November a member of the committee of general safety, when he proved himself at once an ardent persecutor of the montagnards and the emigrants. At the same time he proposed the celebration of the anniversary of the death of Louis XVI. On Feb. 4, 1795, he was elected president of the convention. On the 12th Germinal, when the mob presented themselves in arms, demanding "bread and the constitution of '93," he caused martial law to be proclaimed, and conducted himself with energy. On the 1st Prairial he again beat down the attack of the suburban people. On the 13th Vendémiaire he was intrusted with the command of the troops to protect the assembly, and selected as his assistant Gen. Bonaparte, whose vigorous measures very promptly quelled the royalist insurrection. Elected one of the five members of the directory, he used his office as the means of gaining immense wealth and indulging his taste for debauchery. On the 18th Fructidor, 1798, he executed the *coup d'état*, which changed the complexion of the two councils, and banished the minority of the directory. In the internal revolution which occurred in the directory on the 30th Prairial, 1799, he succeeded in maintaining his position, and thenceforth reigned nearly paramount. A series of intrigues and plots then commenced, which ended only when the directory was overthrown by Bonaparte on the 18th Brumaire. (See DIRECTORY.) Suspected of corresponding with the royalists and strictly watched, he was compelled at last to fly to Brussels, where he lived in great luxury. After the establishment of the empire he was permitted to return to Marseilles. Convicted of participation in Mallet's conspiracy, he was exiled to Rome. He declined serving Murat in 1814, and started for France, but was arrested at Turin, and led to Montpellier, where he conspired openly in the interest of the Bourbons. After the restoration he lived near Paris in almost princely style. His memoirs were published in 1873.

BARRATRY (It. *barrateria*, fraud), in maritime law, fraudulent conduct by the master of a vessel, or by the mariners, to the injury of the owner of the ship or cargo, and without his consent. Gross negligence, or unauthorized acts of the master to the injury of the owner, are also held to constitute barratry. Under the first are included wilful acts, such as destroying or carrying off ship or cargo, or embezzling any part of the cargo; under the second, deviation from the usual course of the voyage by the master for his own private purposes, trading with an enemy, evading port duties, disregard of a blockade, and other acts exposing the vessel or cargo to seizure and confiscation. Barratry is one of the risks commonly insured against, and the underwriter is liable for loss by any of the acts above specified, with the limitations: 1, that the owner in order to recover must not have consented to the act of the master or crew, but the consent of the owner of the ship will not affect the right of the owner of the cargo; so also if the vessel has been chartered, the charterer is *pro hac vice* the owner, and will not be affected by the connivance of the real owner. 2. The underwriter is liable for the acts of mariners only so far as they could not be prevented by ordinary care on the part of the master. Barratry by the wilful burning, casting away, or otherwise destroying a vessel on the high seas, is a highly penal offence in Great Britain, and in this country if done by a person belonging to the vessel not being an owner, as also if done by an owner with intent to defraud an underwriter, shipper, or other part owner. (See BARRETRY.)

BARRE, Antoine Joseph le Fèvre de la, a French naval officer, died May 4, 1688. He was appointed governor of Guiana in 1663, and retook

Cayenne from the Dutch. In 1667 he was created lieutenant general, and defeated the English in the Antilles, forcing them to raise the blockade of St. Christopher. In 1682 he was appointed governor of Canada, taking the place of the count de Frontenac. He was, however, recalled about 1684, for having by his irresolution caused the failure of the expedition to treat with the savages. He published a work on Guiana, entitled *Description de la France équinoxiale* (1666), and *Journal d'un voyage à Cayenne*.

BARRÉ, Isaac, a British soldier and statesman, born in Dublin in 1726, died July 1, 1802. He received his education at Dublin university and afterward studied law in London, but entered the army, was ordered to Canada, and became an intimate friend of Gen. Wolfe, who obtained his promotion at various times, until he reached the rank of lieutenant colonel. He was severely wounded at the capture of Quebec, and was with Wolfe when that general died. He occupies a prominent position in Benjamin West's painting of "The Death of Wolfe." After the surrender of Montreal, Sept. 8, 1760, he was appointed bearer of despatches from Gen. Amherst to Lord Chatham. In 1761, by the influence of the earl of Shelburne, Col. Barré was elected member of parliament for the borough of Chipping Wycombe. Almost his first political act was to make a personal attack upon the earl of Chatham. He has been accused of personal motives in this action, as he had considered Chatham an obstacle in the way of his promotion while in the army. This attack was as bold as it was unexpected, and at once raised Barré to a prominent position among the supporters of the ministry, Chatham leading the opposition. In 1763, after the disbanding of Barré's regiment, he received the appointment of adjutant general to the British forces and governor of Stirling castle, his patron, Lord Shelburne, becoming president of the board of trade; but in December of the same year he was removed from his appointments, having joined the opposition and voted against the government on several occasions. In 1765 he opposed the stamp act, and made a forcible appeal to the house in favor of the colonies. In 1766, under the second administration of Lord Chatham, Col. Barré was appointed one of the vice treasurers to Ireland and was sworn of the privy council. In the discussion upon the question of reporting the parliamentary debates Col. Barré opposed the ministry, and after a full exposure of the corruption then existing, and the strongest denunciation of the corrrupt members, he left the house, calling upon every honest man to follow him. Throughout the administration of Lord North Col. Barré continued the warm friend of the American colonies, and distinguished himself greatly by the boldness with which he advanced his sentiments. On the dissolution of the North ministry, Lord Shelburne became secretary of state for foreign affairs, and Col. Barré treasurer of the navy. Afterward, upon Shelburne becoming premier, Barré received the post of paymaster of the forces, which he held but a short time, as he retired with his patron in 1783, receiving for his services a pension of £3,200 per annum, which was afterward exchanged for the sinecure of clerk of the pells, with £3,000 per annum. Col. Barré continued in parliament till 1790, when he retired, owing to the loss of his sight consequent on a wound received at Quebec. He has been supposed by many to be the author of the Junius letters.

BARRÉGES. See Baréges.

BARREL, a hollow vessel made of staves, set on end, arranged around a circle, and bound together with hoops. By each stave being made wider in the middle and tapering a little toward the ends, the barrel is of larger diameter, or bulges, in the middle. The bevelled edges of the staves cause them to fit closely together, making a tight joint along their length. The ends are closed by circular heads, the edges of which are made thin to fit into a groove cut to receive them near the ends of the staves, in which they are held fast by driving the hoops upon the swell of the barrel. The construction of the barrel is most ingeniously adapted for combining great strength with lightness. It resists pressure from without by the arched arrangement of the staves; and the hoops secure it from the expansive force of gases often generated in its contents. Its form is the most convenient for transportation, admitting of the vessel being rolled or rapidly swung by hooks placed under the chine or ends of the staves. It is not strange, therefore, that many millions of them should be annually made for the numerous uses they serve. In the form of kegs, firkins, liquor casks, butts, hogsheads, &c., they are met with everywhere. Yet the Chinese, with all their ingenuity, it is said, have never made a barrel.—Until recently barrels have been constructed entirely by hand, the cooper shaving the staves with the draw knife, and shaping them by clamps. But machines are now applied to this purpose, by which the work is done much more expeditiously. The staves are planed, steamed, and then passed between a series of rollers, which compress and bend them into proper shape. A stave is next set up on end in a frame, which holds it securely and forces it to its right bend, and swinging around to a plane working vertically on one side, one edge is jointed to its right bevel, and swinging to the other side, the opposite edge is served in the same way, the grooving at each end or crozing, the chamfering of the ends, and sawing off, all being done by different cutters at the same time. Other machines saw the staves, and some cut them with great rapidity directly from the block; but these are for making what are called slack barrels, which do not need to be so perfectly tight and strong as those used to contain most liquids.—As a measure of capacity the barrel is of very variable dimensions, differing in size in the different states,

and with the material it is designed to hold. The measure of capacity called barrel bulk is 5 cubic feet. The old English measures were 31½ gallons for a barrel of wine, 32 for ale, and 36 for beer; but by a statute of 1 William and Mary the beer and ale barrel was equalized to 34 gallons. This, however, only created confusion. The dimensions of the barrel in England are as follows:

	Gallons.	Cubic inches.
Wine barrel	31½	7,316¼
Ale barrel (London)	32	9,024
Ale and beer barrel (England)	34	9,518
Beer barrel (London)	36	10,152

In the United States the barrel for wine, beer, and cider is 31½ gallons. The lamp-oil barrel of Cincinnati contains 43 gallons. The whiskey barrel usually contains from 40 to 45 gallons. In Maryland, a barrel of corn is equal to 5 bushels; a barrel of fish, 220 lbs.; a barrel of flour, 196 lbs.; and of lime, 320 lbs.

BARRELIER, Jacques, a French botanist, born in Paris in 1606, died Sept. 17, 1673. He renounced the medical profession to enter the Dominican order. In 1646 he was selected as assistant of the general of the order on one of his tours of inspection, travelled through France, Spain, and Italy, collected numerous specimens of plants, and also founded and superintended a splendid garden in a convent of his order at Rome, where he remained many years. He afterward returned to Paris and entered the convent in the rue St. Honoré. He left unfinished a general history of plants, to be entitled *Hortus Mundi*. The copperplates of his intended work, and such of his papers as could be found, were collected and made the basis of a book by Antoine de Jussieu, *Plantæ per Galliam, Hispaniam et Italiam observatæ*, &c. (folio, Paris, 1714).

BARREN, a S. county of Kentucky; area, 500 sq. m.; pop. in 1870, 17,780, of whom 3,623 were colored. Its name comes from the immense thinly timbered tracts it contains, which are technically termed "barrens." It is a moderately fertile region, watered by Barren river and two creeks. The superficial soil rests upon cavernous limestone, and sulphurous and saline springs are abundant. The Louisville and Nashville railroad, and its Glasgow branch, traverse the county. The chief productions in 1870 were 111,848 bushels of wheat, 603,541 of Indian corn, 179,609 of oats, 247,771 lbs. of butter, 40,492 of wool, 2,473,939 of tobacco, and 72 bales of cotton. Capital, Glasgow.

BARRETO, Francisco de, a Portuguese governor of the Indies, died on the banks of the Zambesi river in 1574. Distinguishing himself in the army at home, he was sent to command the fortress of Bassain in India, and was appointed governor in 1555. He sent the poet Camoëns into exile at Macao. By order of the Portuguese government he undertook the conquest of that ill-defined and little known portion of Africa called Monomotapa. He set out on this expedition in April, 1569, and struck the continent where the Quilimane river runs into the Mozambique channel. His ambition was to penetrate to the mines of Massapa, whence the queen of Sheba was said to have drawn her treasures, and from which a nugget valued at 12,000 cruzadoes had lately excited cupidity in Portugal. In his explorations he fell a victim to the climate.

BARRETRY (sometimes called barratry), in criminal law, the offence of stirring up suits and quarrels. The person guilty of the offence may be indicted as a common barretor. To sustain the indictment it is necessary that there be proof of not fewer than three distinct acts, and that the suits or quarrels be between other persons. A man may bring any number of suits in his own name without being chargeable with this offence. A similar wrong is the bringing of suits by an attorney in the name of a fictitious plaintiff, which may be treated as a contempt of court.

BARRETT, Benjamin Fisk, an American clergyman and author, born at Dresden, Maine, June 24, 1808. He graduated at Bowdoin college in 1832, and at the divinity school in Cambridge in 1838. While there he became a convert to the doctrines taught by Swedenborg. He was pastor of the first New Church society in New York from 1840 to 1848, and of that in Cincinnati from 1848 to 1850. In 1850 he was obliged to leave the pulpit on account of his health, and went to Chicago, where he engaged in a mechanical business by which in four years he restored his health, and accumulated a fortune. For several years subsequently he was settled over the first New Church society in Philadelphia. His principal works are: "A Life of Swedenborg," "Lectures on the New Dispensation," "Letters on the Divine Trinity," "The Golden Reed," "Catholicity of the New Church," "The Visible Church," "Beauty for Ashes," and "A New View of Hell." He has also published various theological pamphlets and articles in religious magazines.

BARRETT, George Horton, an American actor, born at Exeter, England, June 9, 1794, died in New York, Sept. 5, 1860. He arrived at Boston with his mother, an actress of some celebrity, in October, 1796, and made his first appearance the same year in the part of Cora's child in "Pizarro," at the age of two years. He commenced playing in New York in 1806, at the Park theatre, in the part of Young Norval. In 1826 he became manager of the Bowery theatre, New York, in company with E. Gilfert. He afterward visited England, and in 1837 performed at Drury Lane. He was also manager of the Tremont theatre, Boston, and in 1847 opened the Broadway theatre, New York, then newly erected. In 1855 he retired from the stage. His favorite characters were in genteel comedy, but he also acted in farce and low comedy with great success. From his elegance and stateliness, he was known by the sobriquet of "Gentleman George."

BARRHEAD, a manufacturing village of Renfrewshire, Scotland, on the river Severn, 7 m. S. W. of Glasgow, with which it is connected by railway; pop. about 6,000. It contains cotton mills, bleaching and print works, an iron foundery, and a machine shop, employing in all about 5,000 operatives.

BARRIER REEFS, reefs of coral which rise from great depths among the South sea islands, at a distance of several miles from the coast, and extend along in front of it as a barrier against the heavy roll of the sea. The most remarkable of these is the Great Barrier reef off the N. E. coast of Australia. (See AUSTRALIA, vol. ii., p. 128.) Other reefs of this nature are met with along the opposite coasts of the islands of Louisiade and New Caledonia, and between are numerous coral islands.

BARRINGTON. I. John Shute-Barrington, viscount, an English lawyer and author, born in 1678, died Dec. 14, 1734. In early life he received by will the estate of John Wildman of Berkshire, not related to him and but slightly acquainted. He added the name of Barrington to Shute on acquiring an estate in Essex by the will of Francis Barrington, distantly related to him by marriage, and was created Viscount Barrington in the Irish peerage in 1720. He was expelled from parliament in 1722 for promoting a fraudulent lottery scheme, and devoted his latter years to theological studies. He published *Miscellanea Sacra* (2 vols. 8vo, 1725), and other works of repute. **II. William Wildman,** 2d viscount, son of the preceding, born in 1717, died Feb. 1, 1793. He was secretary at war, chancellor of the exchequer, and treasurer of the navy. **III. Daines,** a jurist and naturalist, brother of the preceding, born in 1727, died March 11, 1800. In 1757 he was appointed a Welsh judge, and afterward second justice of Chester. He published in 1766 "Observations on the Statutes, chiefly the more Ancient, from Magna Charta to the 21 James I., c. 27," a work of merit and authority; and in 1773 an edition of Orosius, with Alfred's Saxon version and an English translation. Most of his other writings, among which are dissertations on the singing and language of birds, on the Linnæan system, and on the probability of reaching the north pole, may be found in the publications of the royal and antiquarian societies, of both of which he was a member, and in his "Miscellanies on Various Subjects" (1781). **IV. Samuel,** a naval officer, brother of the preceding, died Aug. 16, 1800. He was rear admiral of the white, took St. Lucia in the face of a superior force, and distinguished himself at the relief of Gibraltar under Lord Howe. **V. Shute,** a prelate, brother of the preceding, born in 1734, died March 27, 1826. He was chaplain to George III., canon of Christ church, of St. Paul's, and of Windsor, and bishop successively of Llandaff, Salisbury, and Durham. Having gained the sum of £60,000 by a lawsuit, he devoted the whole of it to the foundation of charity schools and the relief of poor clergymen. He edited the *Miscellanea Sacra* of his father, prepared for the press the "Political Life" of his brother Lord Barrington, and furnished valuable notes for a new edition of Bowyer's "Critical Conjectures" on the text of the Greek Testament.

BARRINGTON, Sir **Jonah,** an Irish lawyer and author, born in Queen's county in 1767, died at Versailles, April 8, 1834. He was called to the Irish bar in 1788, and entered the Irish parliament in 1790, as member for Tuam. His maiden speech as a legislator was directed against Grattan and Curran. A sinecure in the Dublin custom house, worth £1,000 a year, was given to him in 1793, and he was made king's counsel. When the question of the union came up, however, he changed sides, voting against it, and displaying such zeal for the liberals, that in 1803 he was very nearly returned to parliament for the city of Dublin in the popular interest, the first four votes in his favor being those of Grattan, Curran, Ponsonby, and Plunket. The Irish government tried to silence him by making him judge of the Irish admiralty court, and also knighting him. Between 1809 and 1815, dissatisfied at not having obtained higher preferment, he published the first volume of his "Historic Memoirs of Ireland," comprising secret records of the national convention, the rebellion, and the union, with delineations of the principal characters engaged in these transactions, bringing the narrative down to the assertion of independence by the Irish parliament. The government dreaded the publication of the concluding volume, which he threatened, and, it is said, induced him to abandon it on condition of receiving the full salary of his office while residing in France, where he was obliged to take refuge from his creditors, his duties being performed by a deputy chosen and paid by the government. In 1827 he published two volumes of "Personal Sketches of his own Times," and a third volume appeared in 1832. This has been twice republished in the United States with great success. In 1830 he was charged in parliament with appropriating to his own use funds belonging to suitors in his court. He went to London to plead his cause, but was removed from office. He now prepared the second volume of his "Historic Memoirs." This work was subsequently reproduced in a cheap form as the "Rise and Fall of the Irish Nation." His sketches are untrustworthy in their details, but give a good idea of political, literary, and social Irish life during the last 40 years of the last century.

BARRON, a N. W. county of Wisconsin, watered by Hay and Vermilion rivers; pop. in 1870, 538. The chief productions in 1870 were 1,665 bushels of wheat, 10,130 of oats, 1,850 of potatoes, and 401 tons of hay.

BARRON, James, an American naval officer, born in Virginia in 1768, died April 21, 1851. He served under his father, JAMES BARRON (died 1787), who held the rank of commodore

in the Virginia navy during the revolution. The son was commissioned lieutenant on the organization of the United States navy in 1798, and the next year promoted to be captain, and under the command of his elder brother, Commodore Samuel Barron, was ordered to the Mediterranean, where he became known for his skill in seamanship as well as his scientific attainments. On June 22, 1807, the frigate Chesapeake, 38 guns, Capt. Gordon, bearing the broad pennant of Com. Barron, got under way from Hampton Roads, bound to the Mediterranean, and was almost immediately boarded by a boat from the British ship Leopard, of 50 guns, Capt. Humphreys, conveying a despatch, signed by Vice Admiral Berkeley, ordering all captains under his command, should they fall in with the Chesapeake anywhere on the high seas, to search her for certain deserters from the British navy, concerning whom correspondence had taken place in Washington between the British minister and the secretary of state, their surrender being refused on the ground that they were American citizens who had been impressed into the British navy. Com. Barron refused to submit to this extraordinary demand, and in a very few moments afterward the Leopard fired a broadside into the Chesapeake. The American ship was in no condition to return it; besides her inferior force, she was in utter confusion on first coming out of port, and although the guns had been loaded, rammers, wads, matches, gun locks, and powder horns were all wanting. The Leopard continued to fire until Barron, finding that no resistance could be made, ordered the colors struck. A single gun was fired by the Chesapeake just as her colors were hauled down. There being no matches at hand, it was discharged by means of a coal brought from the galley. The ship received 21 shot in her hull, and 3 were killed and 18 wounded; among the latter were Com. Barron and his aid, Mr. Broom. Four men claimed as English were taken out of her, and she returned to Hampton Roads the same evening. Intense excitement was created throughout the country by this outrage. Barron was court-martialled under four charges, which embraced 22 specifications. He was entirely acquitted of three of the charges, but was found guilty of two specifications of a charge "for neglecting, on the probability of an engagement, to clear his ship for action," and sentenced to be suspended for five years, without pay or emoluments. The court closed its finding on the subject of the personal conduct of the accused in the following language: "No transposition of the specifications, or any other modification of the charges themselves, would alter the opinion of the court as to the firmness and courage of the accused; the evidence on this point is clear and satisfactory." Admiral Berkeley's conduct was disavowed by the British government, and he was recalled from his command. Capt. Humphreys was placed on half pay. Two of the alleged deserters were afterward returned; one had been executed, and the fourth died. Barron entered the merchant service during his suspension, and remained abroad till 1818, when an attempt was made to restore him to duty. This was resisted by many officers, including Decatur, who had been a member of the court martial, and after a long and bitter correspondence Barron sent Decatur a challenge. The duel was fought at Bladensburg, March 22, 1820. Both fell at the first fire. Decatur died the same night, and Barron recovered after months of great suffering. During the latter years of his life he held several important commands on shore. The command of the squadron in the Pacific was tendered to him, but declined.

BARRON, Samuel, an American naval officer, brother of the preceding, born in Hampton, Va., about 1763, died Oct. 29, 1810. In 1798 he commanded the brig Augusta, which was prepared by the citizens of Norfolk to resist the aggressions of the French. During the war with Tripoli he took a conspicuous position, and in 1805 commanded a squadron of 10 vessels, his flag ship being the President, 44. The bashaw of Tripoli was Yusuf Caramalli, a usurper, who had deposed his brother Hamet. Mr. Eaton, the consul at Tunis, was apprised that it might be of great service to secure the coöperation of Hamet in the war against his brother. Commodore Barron received permission to follow this policy, and accordingly sent three vessels of the squadron, the Hornet, Argus, and Nautilus, with Mr. Eaton and Hamet, which captured the town of Derne on the Tripolitan coast, April 27, 1805. Eaton now pressed Com. Barron for further supplies and reënforcements against Tripoli, but they were denied on the ground that Hamet Caramalli ought to be able to effect his object by means of the ordinary coöperation of the squadron. Com. Barron was perhaps influenced in this decision by other considerations. Capt. Bainbridge, with his officers and men, were at this time held in rigorous captivity in Tripoli, and it was well known that the reigning bashaw had threatened a bloody retaliation. Com. Barron soon afterward relinquished his command to Capt. John Rodgers in consequence of extreme ill health, and returned to the United States. He was considered an excellent officer, and died much respected just as he had been appointed to the command of the navy yard at Gosport, Va.

BARRON, Samuel, an American naval officer, born in Virginia. He entered the U. S. navy as midshipman in 1812. He was attached to the Brandywine when she conveyed Gen. Lafayette to France in 1825; was promoted to be lieutenant in 1827, commander in 1847, and captain in 1855. At the breaking out of the civil war he was appointed chief of the bureau of detail in the navy department. He had already accepted a commission in the confederate navy, and soon went south, and was placed in

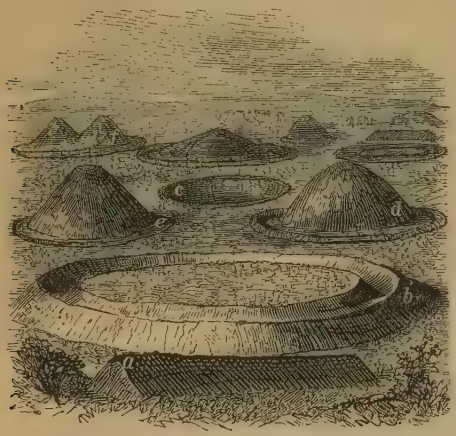
charge of the naval defences of North Carolina and Virginia, with the rank of flag officer. He was at Hatteras inlet at the time of the attack upon Forts Clark and Hatteras by Flag Officer Stringham, Aug. 28, 1861, and by request of the officers commanding the forts assumed the general direction of the defence. After the surrender he was sent to New York, and remained a prisoner of war until exchanged in 1862. During the remainder of the war he was in England, engaged in fitting out blockade-runners and privateers. After the close of the war he returned to Virginia and engaged in farming.

BARROS, João de, a Portuguese historian, born in 1496, died in 1570. He was of noble family and early employed about the court. In 1522 he was governor of a Portuguese settlement on the coast of Guinea, and afterward treasurer of the Indies. He was recommended by the king himself to cultivate history, some of his compositions having been read with approval by his majesty. He wrote the history of Portuguese conquest in India, down to 1526, under the title of *Asia*, in four decades (published 1552–1615). It was continued by Diego de Couto, the historiographer of Philip II. of Spain. The best edition is that of 1777–'8, from the royal press of Lisbon. He also wrote a chivalric romance, *Cronica do Imperador Clarimundo*, and many other works. His style is dignified and his diction elegant and pure. He has been styled the Portuguese Livy.

BARROT. I. Camille Hyacinthe Odilon, popularly known as Odilon Barrot, a French advocate and statesman, born at Villefort, department of Lozère, in July, 1791. His father was a revolutionist, but Odilon became after his admission to the bar in 1814 friendly to Louis XVIII.; but subsequently he was prominent in the opposition, and acquired great celebrity as an advocate, especially in political trials. He contributed as president of one of the principal political associations, and by his activity, to bring on the revolution of 1830, and was secretary of the Paris municipal committee which in July officiated for a few days as a provisional government. He opposed the establishment of a republic as well as the restoration of the elder Bourbons, and contributed much to make Louis Philippe king, but showed personal deference to the deposed monarch, escorting him and his family to Cherbourg. Louis Philippe appointed him prefect of the department of the Seine, but was not able to sustain him against the subsequent attacks of Guizot and his party, who especially censured his attitude during the trial of Polignac. The disorders following the funeral celebration by legitimists of the anniversary of the assassination of the duke de Berri, on which occasion he was accused of negligence, furnished a pretext for his removal, and on Feb. 19, 1831, he resigned the prefecture. He now became a leader of the moderate left in the chamber of deputies, opposing a hereditary peerage, promoting the revision of the penal code and public instruction, and obtaining the repeated adoption of a divorce bill in the chamber, notwithstanding its rejection by the peers. He bore an important part in all the political events which preceded the revolution of 1848, as one of the most eloquent orators and influential statesmen of his day, and was the chief promoter of the famous reform banquets. He submitted to the chamber the act of accusation against the Guizot ministry, signed by 53 of his colleagues, and was appointed by Louis Philippe prime minister on Feb. 24. In this capacity it was his duty to announce the king's abdication and the accession of the duchess of Orleans as regent. He had flattered himself that his influence would allay the revolutionary storm; but he was disappointed, and the republic was proclaimed. He became a member of the constituent assembly, and labored in vain for the adoption of a constitution after the English model. Under the presidency of Louis Napoleon he was appointed minister of justice, with the privilege of presiding over the cabinet in the absence of the prince, Dec. 20, 1848. On April 16, 1849, he assumed the responsibility for the siege of Rome, but retired at the end of October on account of ill health. Subsequently failing to effect a reconciliation between the executive and the legislature, he was among the first to protest against the *coup d'état* of Dec. 2, 1851, and to join in the unavailing proclamation deposing Louis Napoleon. In 1863 he endeavored in vain to be elected to the chamber, and at the close of 1869 he declined to accept the ministry of justice, which was tendered to him by Napoleon III. In 1872 M. Thiers appointed him vice president of the council of state. **II. Victorin Ferdinand,** brother of the preceding, born in Paris, Jan. 10, 1806. He became a member of the chamber of deputies and solicitor of the treasury, and in 1848 he was elected to the constituent assembly for Algeria, and in the following year to the legislative assembly. Having been one of the counsel for Louis Napoleon in his trial for the attempt of Boulogne, he became on the accession of the latter to the presidency secretary general of his cabinet, and for a few months minister of the interior, after which he went in 1850 as minister to Turin, and was reëlected to the legislative assembly. In January, 1852, he became a member of the consultative committee, and subsequently of the council of state in connection with public works, commerce, and agriculture. In 1853 he was made senator, and in 1865 secretary of the senate.

BARROW, the name given to ancient artificial mounds, constructed for purposes which it is sometimes impossible to discover, but which generally appear to have been commemorative of famous persons or events in the history of ancient peoples. They are formed either of earth or of stones, are mentioned in Joshua and Homer, and are found among the relics of Egyptian, Greek, Roman, and Scy-

thian domination. There are also in England and Scotland numerous barrows of Druid



a. Long Barrow. *b, c.* Druid Barrows. *d.* Bell Barrow. *e.* Cone Barrow. *f.* Twin Barrows.

origin. Barrows are also found in large numbers in America, the memorials of an unknown history.

BARROW, a river of Ireland, next in size and importance to the Shannon, rises in the N. part of Queen's county, flows E. to the border of Kildare county, then turns to the south, forming the boundary between the counties of Queen's, Kilkenny, and Waterford on the W., and Kildare, Carlow, and Wexford on the E., passing the towns of Athy, Carlow, and New Ross, and after a course of about 100 m., with a descent of 227 feet, falls into the estuary which forms Waterford harbor. Near its mouth, 8 m. E. of Waterford, it is joined by the Suir, and near New Ross by the Nore. These three rivers are called the three sisters, from their rising in the same mountain ridge, and, after flowing through different counties, uniting near the sea. The Barrow is navigable for vessels of 300 tons as far as New Ross, 25 m., and for barges to Athy, 40 m. further, whence by means of the Grand canal it communicates with Dublin.

BARROW, Isaac, an English divine and mathematician, born in London in October, 1630, died there, May 4, 1677. He was the nephew of Isaac Barrow, bishop of Sodor and Man, and the son of Thomas Barrow, who, though of an ancient Norfolk family, was linendraper to Charles I., whom he followed to Oxford, subsequently attending Charles II. till the restoration. Young Isaac was admitted in 1643 as a pensioner in Peterhouse, Cambridge, and in 1645 entered Trinity college, obtaining the degree of M. A. in 1652 both in Cambridge and Oxford. In 1655 he set out for the continent and the East, and during his journey had a successful contest with an Algerine corsair, of which he wrote a poetical narrative; and in Constantinople he devoted himself to the study of Chrysostom. After his return he became professor of Greek at Cambridge (1660), and of geometry at Gresham college (1662), and fellow of the newly established royal society (1663). In conformity with the will of Lucas, he was the first Lucasian professor of mathematics at Cambridge from 1663 to 1669, when he resigned this post to his pupil and friend Isaac Newton, and devoted himself to theology, his uncle giving him a small sinecure in Wales, and the bishop of Salisbury making him a prebendary. In 1670 he received the degree of D. D.; in 1672 he became master of Trinity college, the king, whose chaplain he was, regarding him as the best scholar of England; and in 1675 he was made vice chancellor of the university of Cambridge. In mathematics, and especially geometry, he had no superior except Newton, whom he was the first to encourage. In geometry he originated the idea of the incremental triangle, and paved the way for the fluxional and differential calculus of Newton and Leibnitz. His posthumous *Lectiones Mathematicæ* (1783) are regarded as a model of sound principles. His principal mathematical works have been translated into English by Kirby and Stone, and by others, and were edited by the late William Whewell for the use of Trinity college, Cambridge (1861). In the latter part of his life he devoted himself exclusively to the church, and his pulpit discourses acquired great celebrity. His sermons were excessively long, but effective and logical, and he was honored as a prodigy of learning, wit, virtue, and piety. In his moments of leisure he composed Greek and Latin verses. He was buried in Westminster abbey, where a monument perpetuates his memory. The first edition of his theological and ethical writings, by Dr. Tillotson and Abraham Hall, appeared in 1685. An edition by the Rev. James Hamilton was published in Edinburgh in 1842, and in New York in 1845 (3 vols. 8vo).

BARROW. I. Sir **John,** an English traveller and author, born at Draleybeck, near Ulverstone, Lancashire, June 19, 1764, died in London, Nov. 23, 1848. He early wrote on land surveying, spent some time in a Liverpool iron foundery, visited Greenland, was professor of mathematics at Greenwich, and, on Sir George Staunton's recommendation, accompanied Lord Macartney as secretary to China, making himself conversant with the Chinese language, and subsequently was with him at Cape Town, as secretary and auditor of public accounts. The services which he rendered in the settlement of the newly acquired Cape Colony led to his being appointed in 1804 second secretary to the admiralty, which office he held till 1845, except for a short time in 1806. He was created a baronet in 1835. He promoted arctic expeditions and geographical science, and originated the plan of the geographical society, of which he was vice president. He wrote nearly 200 essays, chiefly geographical, for the "Quarterly Review," contributed to the "Encyclopædia Britannica," and published

"Travels in Southern Africa" (2 vols., London, 1801–'3); "Travels in China" (1804); "A Voyage to Cochin-China" (1806); lives of Macartney (1807), Lord Howe (1838), Lord Anson (1839), and Sir Francis Drake; "A Chronological History of Voyages into the Arctic Regions" (1818); "Voyages in the Arctic Regions since 1818" (1846); and other works, including his "Autobiographical Memoir" (1847), and "Sketches of the Royal Society" (1849). **II. John,** second son of the preceding, born June 28, 1808, has written "Visit to Iceland" (London, 1835), "Summer Tours in Central Europe" (1857), and other books of travel, and miscellaneous works; and prepared a new edition of Cook's "Voyages of Discovery" (Edinburgh, 1860).

BARROW-IN-FURNESS, a municipal borough, manufacturing town, and seaport of Lancashire, England, on the S. W. shore of the peninsula of Lower Furness, opposite Walney island, the terminus of the Furness railway, 4 m. S. W. of Dalton, and 50 m. N. N. W. of Liverpool; pop. in 1871, 17,992 (in 1847, only 300). The rapid progress of the town is due to its iron and steel works. The annual export of iron ore is estimated at 600,000 tons, and of copper ore at 3,000 tons. The steel works convert about 1,000 tons of pig iron weekly into Bessemer steel, the Barrow hematite iron and steel company being one of the largest establishments of the kind in the world. Great quantities of coal are imported from Wales, and of timber from Canada and the Baltic. The town received a charter of incorporation in 1867, and the duke of Devonshire, the chief owner of the land, inaugurated the new docks in the same year. They are unrivalled in Lancashire in extent and position, except by those of Birkenhead. The town contains a fine town hall and other public buildings. Bathing establishments, and a monument of Mr. Noble, the chief promoter of railway and manufacturing enterprise, were inaugurated in 1872.

BARROW STRAIT, a channel in Arctic America, named after Sir John Barrow, leading W. from Lancaster sound to Melville sound, in lat. 74° N., and between lon. 84° and 96° W. It averages 40 m. in width, and has a depth of 75 to 200 fathoms. Its coasts are mountainous. Capt. Parry first navigated it in 1819–'20.

BARRUNDIA, José Francisco, a Central American statesman, born in Guatemala about 1780, died in New York, Aug. 4, 1854. Many members of his family had acquired eminence in the service of Spain, but he early opposed the mother country, and in 1813 was sentenced to death for treason. He and his fellow conspirators hid themselves in the mountains for six years, when Barrundia placed himself at the head of the revolutionary party of Guatemala. He took a conspicuous part in the struggle for independence, and was a member of the first republican constituent assembly. On April 10, 1824, he introduced and carried a decree for the immediate abolition of slavery throughout the republic, and he subsequently procured the adoption of a code modelled after that of Livingston for the state of Louisiana, which he had translated into Spanish. In 1825 he declined the office of vice president, but in 1829 accepted that of president, and devoted himself to educational and other reforms. When in 1852 three of the five states which had composed the old republic again united, he was unanimously chosen president; but two of the states withdrawing their adhesion, he also withdrew, and employed himself in preparing a narrative of Central American events. In the hope of regaining his ascendancy in Guatemala through American influence, he set out in 1854 for Washington as minister of Honduras, with the alleged design of negotiating for its annexation to the United States; but apoplexy ended his life soon after landing in New York.

BARRY. I. A S.W. county of Missouri, bordering on Arkansas, and drained by King's river, Flat creek, and White river of Arkansas; area, 703 sq. m.; pop. in 1870, 10,373, of whom 52 were colored. It has a hilly surface, in some places covered with forests, in others occupied by rich prairies. The principal rock is limestone. Lead exists in various parts of the county. The Atlantic and Pacific railroad skirts the N. border. The chief productions in 1870 were 71,669 bushels of wheat, 322,808 of Indian corn, 55,348 of oats, and 56,586 lbs. of tobacco. Capital, Cassville. **II.** A S.W. county of Michigan, intersected by Thornapple river; area, 576 sq. m.; pop. in 1870, 22,199. It has an undulating surface, occupied by alternate tracts of fertile prairie and woodland, and dotted with numerous small lakes. The Grand River Valley railroad passes through the county. The chief productions in 1870 were 575,149 bushels of wheat, 373,420 of Indian corn, 212,857 of oats, 12,568 of barley, 244,579 of potatoes, 28,899 tons of hay, 230,554 lbs. of wool, 623,171 of butter, and 138,698 of maple sugar. Capital, Hastings.

BARRY. I. Sir **Charles,** an English architect, born in London in May, 1795, died there, May 12, 1860. He studied in England and in Italy, travelled extensively, and after his return became the first architect in London, acquiring renown especially by his construction of the Reform and Travellers' club houses. His masterwork is the new parliament houses. The corner stone was laid in 1840; the lords assembled in the new house in 1847, and the commons on Nov. 4, 1852. The queen knighted the architect on the opening of the new buildings. He was a royal academician, a fellow of the royal society, and a member of many distinguished bodies at home and abroad. **II. Edward Middleton,** son of the preceding, born in 1830. He perfected his knowledge of architecture under his father, whom he succeeded as architect of the new houses of parliament, and he also completed these and other buildings which were left

unfinished by him. Among his works are the new Covent Garden theatre, the Charing Cross, the Star and Garter at Richmond, and other hotels, the opera house at Malta, the grammar school at Leeds, and other famous structures. In 1867 he became architect of the new national gallery. In 1870 he was made a royal academician.

BARRY, Gerald, or **Giraldus Cambrensis** (Gerald of Wales), a British ecclesiastic and historian, born about 1146, died about 1220. His father was a Norman baron, his mother a descendant of princes of South Wales, and his uncle, David Fitz-Gerald, was bishop of St. David's. He completed his education in the university of Paris, and returned to that city in 1176, after the king's rejection of his appointment as his uncle's successor in the see of St. David's. He declined in 1179 a professorship of canon law in the university of Paris and went back to England, where for four years he was administrator of the see of St. David's during a vacancy of the bishopric, and afterward chaplain of the king, and secretary and privy councillor of Prince (afterward King) John during the latter's visit to Ireland. With Archbishop Baldwin he preached in 1188 in Wales in behalf of the crusaders. He was again elected to the see of St. David's in 1199, and according to some authorities finally obtained possession and resigned in 1203; but according to the commonly received account his nomination was not confirmed. He spent the last years of his life in literary pursuits, and wrote *Topographia Hiberniæ*, in three books; *Expugnatio Hiberniæ*, an account of the Norman conquest of Ireland; *Itinerarium Cambriæ*, or account of the itinerary of Archbishop Baldwin through Wales, an English translation of which has been published by Sir Richard Colt Hoare, with annotations and a life of Giraldus ("The Itinerary of Archbishop Baldwin through Wales," 2 vols. 4to, London, 1806); *De Principis Instructione*; and many other works, of which the *Speculum Ecclesiasticum* and *De Gestis Giraldi laboriosis* are the most remarkable. Most of his works have been printed, either separately or in collections.

BARRY, James, an Irish painter, born in Cork, Oct. 11, 1741, died in London, Feb. 22, 1806. He studied in Dublin, and in Italy under the patronage of Burke. After his return to England in 1770 he painted for the society of arts in London a series of allegorical pictures of human progress, the best of which is that of the "Victors at Olympia." His charges against the administration of the royal academy led in 1797 to his expulsion from that body, and to his removal from the professorship of painting, which he had held for ten years, after which he received a public subscription of £1,000, and a year before his death, through Sir Robert Peel, the father of the premier, a government annuity of the same amount. He was irritable and quarrelsome, and lived most of his life in penury; but he had noble conceptions of art, though his execution and coloring were generally defective. He wrote in 1775 "An Inquiry into the Real and Imaginary Obstructions to Art in England," in which he refuted Winckelmann's theory in respect to the unæsthetic influence of the English climate. His various works were published in 1809 in 2 vols., with his biography.

BARRY, John, an American naval officer, born at Tacumshane, county Wexford, Ireland, in 1745, died in Philadelphia, Sept. 13, 1803. He settled in Philadelphia about 1760, and acquired wealth as master of a sailing vessel. At the commencement of the revolution he offered his services to congress, and in February, 1776, was appointed to the command of the Lexington, 14 guns, and after a sharp action took the tender Edward, the first war vessel captured by a commissioned officer of the American navy. He was transferred to the Effingham frigate, and in 1777, in the Delaware, at the head of four boats, captured an English schooner. Finding naval operations interrupted by the ice, he served for a short time as aide-de-camp to Gen. Cadwalader at Trenton. In 1781, while returning from France in the Alliance, he captured the Atalanta and the Trepassy, and was severely wounded. After the establishment of the present navy in 1794, he was named as the senior officer with the rank of commodore.

BARRY, Marie Jeanne Gomard de Vaubernier, countess du, mistress of Louis XV., born at Vaucouleurs, in Champagne, Aug. 19, 1746, guillotined in Paris, Dec. 6, 1793. She was the daughter of a seamstress, and was employed in a milliner's shop in Paris, where she led a dissolute life. One of her lovers, Count Jean du Barry, brought her through his valet to the notice of Louis XV., who made her marry the count's brother, after which she was introduced at court. By her beauty and wit she retained the king's affection until his death. She cost France over 35,000,000 francs, out of which she provided for her relatives and friends, and also to some extent for charitable works. She persuaded the king to banish his prime minister, the duke de Choiseul, her unrelenting enemy, and to dismiss and exile the parliament of 1771. On the king's death Louis XVI. banished her from court, but after a year she was permitted to return to the wing of the royal palace which had been built for her use at Lucienne, near Versailles, and lived there with her lover, the duke de Brissac, in shameful luxury. After a journey to England she was arrested in July, 1793, upon a charge of having squandered public funds, conspired against the republic, and worn mourning in London for the royal family. Sentenced to death Dec. 6, she bore herself with fortitude during the trial, but her courage deserted her on the way to the scaffold, and to the last moment she continued her piteous appeals for mercy. She was an illiterate woman, though she patronized some small poets.

BARRY, Martin, an English physiologist, born at Stratton, Hampshire, in March, 1802, died at Beccles, Suffolk, April 27, 1855. He received his doctor's diploma in Edinburgh in 1833, and was house surgeon of the royal maternity hospital in that city. He was the first to demonstrate, in his contributions to the "Philosophical Transactions" of the royal society of London (1840–'43), that spermatozoa actually penetrate within the ovum. He also established the fact of the segmentation of the yolk in the mammals, and made other discoveries in embryology.

BARS (Ger. *Barsch*), a county of N. W. Hungary, traversed by the Gran; area, 1,031 sq. m.; pop. in 1870, 137,191, more than half of whom are Slovaks, and the rest Magyars, Germans, and Jews. It is mountainous in the north, where the rocky soil is unfavorable to agriculture, though fitted for cattle breeding. The south is very fertile. The county is chiefly celebrated for its mineral wealth, which embraces gold, silver, copper, iron, lead, and antimony; but the production of the precious metals is declining. The richest mines are those of Kremnitz, the Austro-Hungarian gold (Kremnitz) ducats being coined in that town. Capital, Aranyos-Maróth.

BARSAC, a village of France, in the department of the Gironde, 21 m. by railway S. E. of Bordeaux; pop. in 1866, 3,076. It produces famous white wines which belong to the vintage of Graves. The ordinary Barsac is less delicate but stronger than Preignac, but the wines of upper Barsac are remarkable alike for strength and aroma. When old, the color becomes that of ambergris.

BARSUMA, or Barsumas. I. A Nestorian bishop of the 5th century, died about 489. Having been expelled from the school of Edessa, he took refuge in Persia, accompanied by many of his followers, and in 435 was created bishop of Nisibis. He acquired great influence with the Persian king Ferozes, whom he induced to expel all Christians who adhered to the teachings of the Greek fathers, and not only to admit Nestorians in their place, but to allow them to establish themselves in the chief cities, Seleucia and Ctesiphon. He established the famous school at Nisibis, from which went forth missionaries who in the next century carried the Nestorian doctrines into Syria, Egypt, Arabia, India, Tartary, and China. The Nestorians of Persia and the neighboring countries still venerate him as the parent and founder of their faith. He upheld the right of the clergy to marry, and himself espoused a nun named Mammæa. He was the author of discourses, homilies, hymns, and a Syriac liturgy, none of which are extant. **II.** A Syrian archimandrite, who headed the Eutychian party at the so-called "robber council" of Ephesus in 449. By the Jacobites he is held to have been a saint and worker of miracles.

BAR-SUR-AUBE, a town of France, department of Aube, on the river Aube, 29 m. E. S. E. of Troyes; pop. in 1866, 4,809. It is very ancient, and has some old churches, a hospital founded in the 11th century, and a college. In January and February, 1814, it was the scene of two battles, in consequence of which it was nearly destroyed. It has a trade of some importance in breadstuffs, wine, wood, hemp, and wool, and has extensive nurseries of fruit and ornamental trees.

BAR-SUR-SEINE, a town of France, department of Aube, on the Seine, 16 m. S. S. E. of Troyes; pop. in 1866, 2,770. It was a large place in the middle ages, but it was several times ruined during the Burgundian wars. On March 1, 1814, a battle was fought under its walls between the French under Macdonald and the Austrians under the prince of Würtemberg. It trades in breadstuffs, wines, brandies, wool, and hemp.

BART, or Baert, Jean, a French naval officer, born at Dunkirk, Oct. 20, 1651, died there, April 27, 1702. He was the son of a fisherman, and early took to the sea. The royal navy being at this period inaccessible to persons of his class, he distinguished himself in command of a privateer. Louis XIV. commissioned him to cruise in the Mediterranean, and in 1697, in consequence of his bravery, appointed him captain of the squadron during the French war with the Netherlands. Bart became by his unexampled feats of daring the terror of the enemy. On one occasion, a famine existing in France, he recaptured from the Dutch 100 vessels loaded with grain. At another time, when Dunkirk was blockaded, taking advantage of a fog, he sailed through the English and Dutch fleets, and destroyed 86 merchantmen; then making a descent near Newcastle, he destroyed 200 houses, and returned safely with property valued at 500,000 crowns. He was married twice, and had 13 children. His elder son, FRANÇOIS (born in 1677, died in 1755), became vice admiral. Jean's brother GASPARD was likewise a brave sailor, as were also other members of the family, the last of whom died in the French West Indies in 1843, with the rank of lieutenant. M. Vanderest's *Histoire de Jean Bart* was adopted in 1841 as a text book in the maritime schools of France. A statue of Jean Bart was erected at Dunkirk in 1845.

BARTAS, Guillaume de Salluste du, a French poet, born in Gascony in 1544, died in 1590 of wounds received at the battle of Ivry. His principal poem is *La première semaine, ou la création*, which passed through 30 editions in six years. It was translated into English by John Sylvester. The most complete edition of this now obsolete work is that of 1611 (2 vols., Paris).

BARTFELD (Hun. *Bártfa*), a town of North Hungary, in the county of Sáros, on the river Topla, near the Galician frontier, 155 m. N. E. of Pesth; pop. in 1870, 5,303. It is an old royal free town, has a gymnasium, and carries on trade in wine, brandy, earthenware,

and linen. It was formerly an important emporium of the trade with Galicia, but its commercial activity has declined. It contains a Gothic church with fine works of art, and a town hall with many valuable historical records. The town was founded early in the 14th century, and the first general synod of Hungarian Protestants was held here. About 2 m. N. of the town are mineral springs salutary in nervous and other diseases. The water is excessively strong and cold even in summer, but never freezes, and it is extensively exported. It is drunk cold and used in hot baths.

BARTH, a town of Germany, in the Prussian province of Pomerania, at the mouth of the river Barth, which forms its port, 14 m. W. of Stralsund; pop. in 1871, 5,774. In the 15th century it was a commercial town of considerable importance and the residence of several dukes of Pomerania. It still has a large coasting trade. From 1630 to 1815 it belonged to Sweden.

BARTH, Christian Gottlob, a German divine and philanthropist, born in Stuttgart, July 31, 1799, died in Tübingen, Nov. 12, 1862. He was educated at Stuttgart and Tübingen, and in 1824 was appointed pastor at Möttlingen in Würtemberg. In conjunction with the missionary institute of Basel he instituted a missionary society in Würtemberg, and published a periodical, the *Calwer Missionsblatt*, devoted to the enterprise. He travelled in Switzerland, France, and England, in the interests of the missionary cause, and founded at Calw an institute for training poor children. His books have had an almost unexampled circulation. Of the "Bible History" and "Bible Stories" a million copies have been published in more than ten languages. He was a fluent versifier, writing hymns and short poems for children, many of which have been introduced into popular German collections. His principal works are: *Biblische Geschichte für Schulen und Familien*, often republished; *Kirchengeschichte für Schulen und Familien* (Calw, 1835); *Christliche Gedichte* (Stuttgart, 1836); and *Kinderblätter* (Calw, 1836).

BARTH, Heinrich, a German explorer and traveller, born in Hamburg, Feb. 16, 1821, died in Berlin, Nov. 25, 1865. He was educated at Hamburg and Berlin, travelled through Italy and Sicily, and in 1845 began explorations in Africa. Starting from Tangier in Morocco, he proceeded along the coast of Algeria, Tunis, and Tripoli, making excursions into the interior, reached Benghazi, and thence went across the desert to Egypt. During this journey he was attacked by wandering Arabs, severely wounded, and robbed of his papers. He traversed Egypt, the peninsula of Sinai, Palestine, Asia Minor, the islands of the Ægean sea, and Greece. In this journey he expended $14,000 from his own fortune. Part of the results of his enterprise appeared in 1849 in his *Wanderungen durch die Küstenländer des Mittelmeeres*, of which only the first volume was ever written; for while engaged in preparing the second he received a proposition from the British government to undertake an expedition into central Africa, as scientific associate of James Richardson. In the winter of 1849–'50 Richardson, Overweg, and Barth met at Tripoli, having procured a boat for the navigation of Lake Tchad. Barth made a preliminary trip through Tripoli, and on April 2, 1850, the three explorers set out for the interior of Africa, joining the great semi-annual caravan for Bornoo. On May 6 they reached Moorzook, the capital of Fezzan, which they left June 13, proceeding in a S. W. direction through the territory of Air or Asben, which had never before been visited by Europeans. Barth left his companions to visit a remarkable mountain which appeared to be only a few hours distant, but proved to be much further. He lost his way, and for 28 hours remained without water, preserving his life by sucking the blood from his own arm. He was at length found, and the natives looked upon him as a demigod, for they had never known any one to live more than 12 hours without water in the hot desert. Before reaching Agadez the travellers were attacked by fanatical Moslems, and narrowly escaped death. At Tintellust they were detained from September to December, 1850, by a native chief. Effecting their release by an appeal to the sultan of Ennoor, they went on to Agadez, where they separated, intending to reunite at Kuka in April. Richardson died March 4, when six days' journey from the rendezvous, but Barth was able to secure his papers, which he forwarded to England. At Kuka Barth was kindly received by the sultan of Bornoo, whose vizier lent him $100, his funds being exhausted, and no remittances having arrived. Overweg had in the mean time made an independent excursion toward Sackatoo, and rejoined Barth at Kuka May 7. During these journeys both travellers found articles of American manufacture among the wildest tribes, which they supposed had been received in exchange for slaves. The travellers again separated, Barth setting out for Adamawa, with an escort from the sultan of Bornoo, May 29. For four weeks he travelled southward through forests abounding with lions and elephants. On June 19 he came upon the great river Benoowe, at its junction with its affluent the Faro, and at once correctly conjectured that it must be the same with the Tchadda, or eastern branch of the Niger, described by the Landers and others. Arriving at Yola, the capital of Adamawa, some defect in etiquette was found in the letters with which he had been furnished by the sultan of Bornoo, and he was ordered to leave the country within three days. He turned back, and reached Kuka July 22. Overweg had reached Lake Tchad with the boat which had been brought overland from Tripoli, and had spent five weeks in exploring it, being the first European who had ever sailed upon its waters. The travellers remained at Kuka till November,

1851, when they planned another journey to Kanem and Borgoo, a vast unexplored region lying N. E. of the lake, and stretching half way to Nubia; but they were assailed by Arabs, and forced to return to Kuka. They found the sultan about to send an army 20,000 strong to subjugate Mandara, a country S. E. of Bornoo. They joined this expedition, which after marching 200 miles returned in triumph, with a booty of 5,000 slaves and 10,000 cattle. After resting nearly two months, Barth, near the close of March, 1852, set out for Baghirmi, a kingdom E. of Bornoo, which no European had ever visited. Here he was again forced to return, reaching Kuka Aug. 20. During his absence Overweg tried to penetrate the Fellatah kingdom of Yakoba, N. W. of the Benoowe, but his health was shattered, and he returned to Kuka, near which place he died, Sept. 27, 1852. Barth was now alone; but fresh funds reaching him from the English government, he resolved to pursue his explorations, sending his papers to England, with a request that another associate should be provided for him, and fixing upon the kingdom of Timbuctoo as his destination. He had sound health, goods for presents worth $200, four camels, as many horses, and five trusty servants, all well supplied with arms and ammunition. The party left Kuka Nov. 25, 1852, reached Sackatoo in April, and Timbuctoo Sept. 7, 1853. For many months nothing was heard of Barth except a rumor that he was dead. Meanwhile Edward Vogel, a German employed as an assistant to the British royal astronomer, volunteered to go in search of him. He was attended by a company of sappers and miners. At Tripoli he was joined by Mr. Warrington, son of the British consul. They reached Kuka in December, 1853. Here Warrington died; but Vogel learned that Barth was alive, and had left Timbuctoo, where he had been detained nearly a year. The vizier of Bornoo had forwarded the report that he had died, hoping that this would soon be the case, so that the supplies of the expedition might fall into his own hands. But civil troubles arising, the vizier was deposed, and Barth was protected by the sheik of Timbuctoo, who furnished him with an escort as far back as Sackatoo. He succeeded in exploring the middle course of the Quorra or Niger, which had not been before done by any European except Mungo Park, whose journal perished with him; he also discovered two considerable kingdoms, Gando and Hamd-Allahi, the existence of which had before been unknown. On Oct. 17 he reached Kano, the largest town in central Africa, where, his funds being exhausted, he succeeded in procuring a loan by paying 100 per cent. interest. On Dec. 1, 1854, he was met by Vogel, the first European he had seen since the death of Overweg, more than two years before. Having wintered at Kuka, Barth started for home in May, 1855, and reached Marseilles Sept. 8, having been absent nearly six years. After visiting his friends in Germany, he went to London to prepare an account of his explorations. The "Travels and Discoveries in North and Central Africa" appeared simultaneously in English and German (5 vols., London and Gotha, 1855–'8), with numerous illustrations, many of them colored, and elaborate maps of his various routes. This is Barth's great work, and, though heavy and diffuse in style, it is still the most valuable book of African travel which has appeared. Barth made it a point, wherever he was, to study the language and history of the country, and he brought to light much that would otherwise have been wholly lost to the student. Having completed the account of his African travels, he made several other journeys, of which he published accounts: *Reise von Trapezunt durch die nördliche Hälfte Kleinasiens nach Scutari* (Gotha, 1860); *Reise durch das Innere der europäischen Türkei* (Berlin, 1864); and in 1865 he made a tour in Albania and Montenegro. At the time of his death he was professor extraordinary of geography in the university of Berlin. His posthumous work, *Sammlung Centralafrikanischer Vocabularien*, appeared in 1866.

BARTHÉLEMY, Auguste Marseille, a French poet, born in Marseilles in 1796, died there, Aug. 23, 1867. He excelled as a satirist, and his *Rome à Paris* (1826) passed through many editions. About 1825 he formed a literary partnership with Méry, another satirical poet, and together they published *La Villéliade*, an attack on the ministry of Villèle, and in 1828 *Napoléon en Égypte*, copies of which were sent to every member of the Bonaparte family. In 1829 he published *Le fils de l'homme*, an account of a visit to the duke of Reichstadt, for which he was fined and imprisoned. He was alternately a satirist of the government and of the opposition, his course being determined by pensions, fines, and imprisonments. Among the latest of his many productions was *Le deux décembre* (1852), a vindication of Louis Napoleon's *coup d'état*.

BARTHÉLEMY, François, marquis de, a French diplomatist, born at Aubagne, Oct. 20, 1747, died in Paris, April 3, 1830. He was educated by his uncle, Jean Jacques Barthélemy, and became prominent in the diplomatic service, especially at Basel, where in 1795 he negotiated the first treaties of peace of the republic with Spain, Prussia, and Hesse-Cassel. He was a member of the directory, and after the 18th Fructidor was transported with Pichegru to Guiana, whence he escaped to the United States and to England. He was among the first recalled by the first consul, who made him a senator, and afterward a count. He voted to make Bonaparte consul for life, and presided in 1814 over the senate which deposed the emperor, for which Louis XVIII. created him a peer. After the hundred days he was made a minister of state and marquis. His motion in 1819 for reducing the electoral vote became one of the principal sources of political agitation during the restoration.

BARTHÉLEMY, Jean Jacques, a French archæologist and author, born at Cassis, Jan. 20, 1716, died in Paris, April 30, 1795. He was educated for the church, and retained the title and costume of an abbé, but devoted himself chiefly to archæological studies. In 1753 he became director of the cabinet of medals and coins, which he made the most renowned and extensive collection in the world. While visiting Italy in 1754–'7 for the acquisition of ancient medals, he formed the acquaintance of M. de Stainville, afterward duke de Choiseul and prime minister, who placed him in possession of handsome revenues; and though Barthélemy made a modest use of his good fortune, it yet exposed him to the animosity of D'Alembert and others. As early as 1748 he was admitted to the academy of inscriptions and belles-lettres, and in 1789 he was elected to the French academy. He was arrested in 1793, but released through the intervention of the minister of the interior. He wrote many learned disquisitions on numismatics and archæology, published a romance and some poetry, and left the MS. of his *Voyage en Italie* (edited by Sérieys, Paris, 1802); but his fame rests on his *Voyaye du jeune Anacharsis en Grèce* (4 vols., 1788), on which he labored 30 years, and which has passed through many editions, serving for a long time as a text book on ancient Greece. It has been translated into English and most other European languages.

BARTHÉLEMY-SAINT-HILAIRE, Jules, a French savant, born in Paris, Aug. 19, 1805. He was employed in the ministry of finance and as assistant professor of French literature in the polytechnic school till 1838, when the first portion of his translation of Aristotle gained for him the chair of Greek and Latin philosophy in the collége de France, followed the next year by a seat in the academy of moral and political sciences. In 1840 he served for some time under Cousin in the ministry of public instruction. He became connected with the *Globe* and other newspapers, was an earnest opponent of Charles X. and of Louis Philippe, and after the revolution of 1848, as member of the constituent and legislative assemblies, was one of the leaders of the conservative republicans. He made an unsuccessful attempt to have Gen. Cavaignac censured for the ineffectiveness of the measures taken to suppress the insurrection of June in its beginnings. He denounced the usurpation of Louis Napoleon in December, 1851, and for a short time was a prisoner at Mazas. He resigned his connection with the collége de France, which had been placed under his direction, and did not resume his professorship till 1862. In the mean time he had coöperated with M. de Lesseps in the Suez canal project (1855–'8), and visited Egypt as one of the representatives of that enterprise. In 1869 he was elected to the national assembly, and in 1871 he became secretary general of the cabinet of his old and intimate friend M. Thiers, with whom he was elected in 1872 member of the geographical society. His translation of the works of Aristotle (17 vols. 8vo, 1837–'66) is the first complete French version, and is very fully annotated. He has also published a memoir *De la Logique d'Aristote* (2 vols. 8vo, 1838). Among his other works are several on Buddhism, *Mahomet et le Coran* (1865), and *Philosophie des deux Ampère* (1866).

BARTHEZ, or **Barthès. I. Paul Joseph,** a French physician, born at Montpellier, Dec. 11, 1734, died Oct. 15, 1806. He early acquired renown as an army physician, and about 1760 became a professor in the medical school of Montpellier, and in 1773 coadjutor and prospective successor of the chancellor of the faculty. He was also received doctor of law in 1780, and appointed councillor in the court of aids. His haughty character led him into disagreements with his colleagues, wherefore he removed to Paris in 1781, and became consulting physician to the king, member of the council of state, and of many learned societies. He lost his places at the revolution, but was afterward honorary professor at Montpellier, and received many tokens of regard from Napoleon. He explained the animal economy by the theory of a vital principle, and has been called the Hegel of medical science. His method is stated in his *Nouveaux éléments de la science de l'homme* (Montpellier, 1778; enlarged ed., 2 vols., Paris, 1806), which has been translated into most European languages. His *Nouvelle mécanique des mouvements de l'homme et des animaux* (Carcassonne, 1798), and his *Traitement des maladies goutteuses* (2 vols., Paris, 1802; new ed., 1819), have been translated into German. Among his other numerous writings are two posthumous works, *Traité du beau* (edited by his brother, 1807), and *Consultations de médecine* (2 vols., 1810). **II. Antoine Charles Ernest de,** a French physician, grand-nephew of the preceding, born at Narbonne about 1800. He received his doctor's diploma in Paris in 1839, became physician to several hospitals, and prepared with M. Rilliet his *Traité clinique et pratique des maladies des enfants* (new ed., 3 vols., Paris, 1853–'4), which won prizes from the medical academy and academy of sciences.

BARTHOLD, Friedrich Wilhelm, a German historian, born in Berlin, Sept. 4, 1799, died Jan. 14, 1858. He studied history under Raumer, and was teacher at the Frederick's college of Königsberg (1826–'31), and professor of history at the university of Greifswald (1831–'58). His principal works are: *Der Römerzug König Heinrich's von Lützelburg* (2 vols., Königsberg, 1830–'31); *Geschichte des grossen deutschen Krieges von Gustav Adolf's Tode ab* (Stuttgart, 1841–'3); *Geschichte der deutschen Städte und des deutschen Bürgerthums* (4 vols., Leipsic, 1850–'52); and *Geschichte der deutschen Hansa* (Leipsic, 1854).

BARTHOLDY, Jakob Salomon, a German diplomatist and patron of art, born in Berlin, May 13, 1779, died in Rome, July 27, 1825. He was of a rich Jewish family, studied at Königsberg,

spent several years in Paris, visited Italy and Greece, and in 1805 became a convert to Protestantism. He fought in the Austrian army against the French, and roused the national spirit by his *Krieg der tiroler Landleute*, 1809 (Berlin, 1814). In 1813 he held a place in the Prussian chancery under Hardenberg, attended the congresses of Vienna and Aix-la-Chapelle, and was consul general in Italy from 1815 to 1818, and afterward chargé d'affaires in Florence. He published in 1815 an anonymous biography of his friend Cardinal Consalvi, employed Cornelius, Overbeck, and other German artists in Rome in fresco painting, and left a large art collection, the greater part of which, chiefly bronzes, vases, and terra cotta, has passed into the possession of the museum of Berlin.

BARTHOLIN. I. Kaspar, a Danish physician and savant, born at Malmö, Sweden, Feb. 12, 1585, died in Copenhagen, July 13, 1629. He taught medicine in Basel, practised at Wittenberg, and was successively professor of rhetoric, medicine, and theology at the university of Copenhagen. His principal work, *Institutiones Anatomicæ* (Wittenberg, 1611), has passed through several editions and been translated into foreign languages. **II. Thomas,** son of the preceding, born in Copenhagen, Oct. 20, 1616, died at Hagested, Dec. 4, 1680. He was a physician, professor of mathematics, and for 11 years of anatomy, in Copenhagen, and finally became physician to the king, director of the university library, and adjunct judge of the supreme court. He is especially distinguished as the reputed discoverer of the lymphatic system of vessels, though the priority in this matter was contested by Olaus Rudbeck of Sweden. His works were very numerous, the most important being *De Lacteis Thoracis in Homine Brutisque* (Copenhagen, 1652), and *Vasa Lymphatica nuper Hafniæ in Animalibus inventa et in Homine, et Hepatis Exequiæ* (1653).

BARTHOLOMEW, a southeastern county of Indiana, drained by Flat Rock creek and Driftwood fork of White river; area, 375 sq. m.; pop. in 1870, 21,133. The eastern part is generally level, but in the west are hills of some elevation. The Jeffersonville, Madison, and Indianapolis railroad and its Shelbyville division pass through the county. In 1870 the chief productions were 491,424 bushels of wheat, 1,529,675 of Indian corn, 111,839 of oats, 67,352 of potatoes, 9,370 tons of hay, 221,086 lbs. of butter, and 47,590 of wool. There were 6,189 horses, 4,372 milch cows, 7,816 other cattle, 15,838 sheep, and 38,546 swine. Capital, Columbus.

BARTHOLOMEW BAYOU, a large stream of the S. W. United States, rises N. W. of Pine Bluff, Jefferson county, Arkansas, and flows very tortuously S. E., S., and S. W. into the Washita river at Washita City, Morehouse parish, Louisiana. It is navigable by steamboats for 250 m.

BARTHOLOMEW. I. Valentine, an English painter, born Jan. 18, 1799. He acquired renown as a flower painter, and has been for over 30 years a member of the society of water-color painters. **II. Anne Charlotte,** a miniature and flower painter and poetess, second wife of the preceding, born at Loddon, Norfolk, early in this century, died Aug. 18, 1862. She was a daughter of Mr. Arnall Fayermann and a niece of Dr. John Thomas, bishop of Rochester. In 1827 she married Mr. Walter Turnbull, a composer of popular songs, who died in 1838; and in 1840 she became the wife of Mr. Valentine Bartholomew. She was a member of the society of female artists, and published "The Songs of Azrael," a volume of poems; "The Ring, or the Farmer's Daughter," a play (1829); and "It's Only my Aunt," a farce (1849).

BARTHOLOMEW, Saint, one of the twelve apostles, a native of Galilee, and generally supposed to be the same as Nathanael, who is mentioned by St. John among the first disciples of Christ. According to Eusebius and other ancient authors, he preached the gospel in the Indies, under which name they generally include not only India proper, but also Arabia and Persia. It is related that in the third century traces of Christianity were found in those countries, and that a copy of St. Matthew's Gospel in Hebrew was preserved by the natives, who had a tradition that St. Bartholomew left it there when he came among them to preach the faith. He afterward journeyed into Phrygia, met St. Philip at Hierapolis, and thence passed into Lycaonia. Beyond this we are told little of his life and travels, and even the meagre accounts which we have received are of doubtful authenticity. The place and manner of his death are equally uncertain. Modern Greek writers assert that he was crucified at Albanopolis; others that he was flayed alive. As we know that it was not unusual in some parts of the East to unite these two barbarous punishments, it is possible that both accounts may be true. The relics of this apostle have undergone many vicissitudes. We hear of them at Dura in Mesopotamia, in the island of Lipari, and at Benevento. It is believed by Roman Catholics that they rest beneath the high altar in the church of St. Bartholomew at Rome. A gospel anciently attributed to St. Bartholomew was declared apocryphal by Pope Gelasius I. A collection of writings also ascribed to him, but doubtless without reason, is known to have existed during the first four centuries of the Christian era, although no part of it now remains. His festival day in the Roman church is Aug. 24, and in the Greek June 11.

BARTHOLOMEW, Saint, Massacre of, the slaughter of Huguenots in France on St. Bartholomew's day (Aug. 24), 1572. It is maintained on the one hand that it was the result of a plot laid long beforehand to annihilate the Huguenots, in which religion had the prominent part; on the other, that it was a sudden outbreak, arising wholly from political motives. A desperate struggle had for many years been waged in

France between the Catholics and the Huguenots, in which both parties committed numerous outrages. It took finally the form of a conflict between the houses of Guise and Condé. The feeble Charles IX. was now king, his mother Catharine de' Medici being the real sovereign. It being certain that neither Charles nor his brother Henry would have children, Henry of Navarre, afterward Henry IV., was the next heir to the throne. He was by birth and education a Protestant, and had distinguished himself in war. In 1570 a peace had been patched up between the parties, which was to be rendered more secure by the marriage of Henry with Margaret of Valois, the sister of the king. August 18, 1572, was fixed upon for the wedding, and many of the principal Huguenots were gathered in Paris. On the 22d Admiral Coligni, one of the foremost Huguenots, was fired upon by an assassin named De Maurevel, known to have been a creature of Catharine, who was jealous of the influence which the admiral had acquired over the king. It has been maintained by many that the marriage between Henry and Margaret was a scheme intended only to collect the Huguenot leaders in Paris in order that they might all be put to death at once, and that the assassination of the admiral was to be the signal for a general massacre. Coligni was not killed, but severely wounded. The king visited him, and swore that the assassin should be punished. The Huguenots were alarmed, and uttered violent threats. Catharine persuaded her son that they were on the point of massacring the Catholics, and that the only thing to be done was to anticipate them. At her urgency, Charles in the night of the 23d gave an order for a general massacre of the Huguenots, the signal to be the tolling of the matin bell of St. Germain l'Auxerrois. The execution of this measure was intrusted to the duke of Guise and the Italian guards of the palace, supported by the companies of the burghers. Orders were also sent to all the principal provincial cities, directing a simultaneous massacre throughout France. It is said that the king was reluctant to give these orders, and that at the last moment he countermanded them; but the duke of Guise, to whom the counter-order was given, replied that it was too late, and mounting his horse rode off toward the hotel of Coligni, for the completion of the murder of the admiral was the first step to be taken. A band of assassins burst into his apartment, ran him through the body, and flung the corpse from the window into the street, where the duke of Guise was waiting on horseback. He dismounted and wiped the blood from the face of the victim in order to be sure that there had been no mistake as to the person. At 4 o'clock in the morning the signal was given, and the general massacre commenced. It is said that Charles, with his brother Henry of Anjou and their mother, was at the time in the tennis court; that he was at first overcome with horror, but soon began himself to fire from the windows of the Louvre. But this statement rests upon insufficient authority, and is inconsistent with his conduct before and after. He died 21 months after the massacre, not without suspicions of having been poisoned by his mother and brother, although the Huguenots ascribed his death to the direct visitation of God. His agony of mind and body was extreme. He "sweat blood," say credible historians, "from every pore," and died exclaiming, "Oh, how much blood! how many assassinations! Oh, what evil counsels have I followed! O Lord God, pardon me, and have mercy upon me!" The slaughter in Paris lasted for several days. Condé and Henry of Navarre escaped by attending mass, and pretending to become Catholics; but most of the Huguenots gathered in Paris were killed. But the slaughter was not confined to them. Many who had grudges to avenge, or something to gain by the death of others, took occasion to gratify their malice or cupidity. The orders for the massacre were executed in nearly all the cities and towns of France where Huguenots were to be found as speedily as they could be received from Paris. It occurred at Meaux on Aug. 25; at La Charité on the 26th; at Orleans on the 27th; at Saumur and Angers on the 29th; at Lyons on the 30th; at Troyes on Sept. 2; at Bourges on the 11th; at Rouen on the 17th; at Toulouse on the 23d; at Romans on the 30th; at Bordeaux on Oct. 3. Many districts and towns, however, were spared, generally through the opposition of their governors or local authorities. The number of persons put to death in all France is variously stated at 100,000 to 1,500. The former number is doubtless much too great; the latter much too small. The estimate of De Thou, 20,000, is probably near the truth. — The subsequent conduct of the French government throws considerable light upon the origin of the massacre. Lingard states it as follows: "The bloody tragedy had been planned and executed at Paris with so much expedition that its authors had not determined on what ground to justify or palliate their conduct. In the letters written the same evening to the governors of the provinces and to the ambassadors at foreign courts it was attributed to the ancient quarrel and insatiate hatred which existed between the princes of Lorraine and the house of Coligni. But as the duke of Guise refused to take the infamy on himself, the king was obliged to acknowledge in parliament that he had signed the order for the death of the admiral, and sent in consequence to his ambassadors new and more detailed instructions. La Motte Fénelon, the ambassador to England, assured Elizabeth that Charles had conceived no idea of such an event before the preceding evening, when he learned with surprise and astonishment that the confidential advisers of the admiral had formed a plan to avenge the attempt made on

his life by surprising the Louvre, making prisoners of the royal family, and putting to death the duke of Guise and the leaders of the Catholics; that the plot was revealed by one of the council whose conscience revolted from such a crime; that his deposition was confirmed in the mind of the king by the violent and undutiful expressions uttered by Coligni in the royal presence; that having but the interval of a few hours to deliberate, he had hastily given permission to the duke of Guise and his friends to execute justice on his and their friends; and that if, from the excited passions of the populace, some innocent persons had perished with the guilty, it has been done contrary to his intention, and has given him the most heartfelt sorrow." The balance of evidence evinces that the original plan, formed by Catharine de' Medici and the duke of Guise, was simply to disorganize the Huguenot party by the murder of Coligni, their recognized leader; that the partial failure of this threw the court into alarm, and the weak king, persuaded that his person was in danger, consented to issue the order for the massacre, which, as expressed by Lingard, "was not originally contemplated, but grew out of the unexpected failure of the attempt already made upon the life of the admiral."—A grave question has arisen as to the supposed complicity of the papal court in the massacre. The despatches of the papal nuncio at Paris seem to set this question at rest. On the very day of the massacre he wrote to the cardinal secretary at Rome an account of the matter. A month later (Sept. 22), in reply to inquiries for more detailed information, he wrote: "The queen regent, having become jealous of the admiral, came to the resolution a few days before, and caused the arquebuse to be discharged at him without the knowledge of the king, but with the participation of the duke of Anjou, and of the duchess of Nemours, and of her son the duke of Guise. Had he died immediately, no one else would have perished. But he did not die, and they began to expect some great evil; wherefore, closeting themselves in consultation with the king, they determined to throw shame aside, and to cause him to be assassinated with the others; a determination which was carried into execution that very night." This account was contained in a cipher despatch from the nuncio at Paris to the government at Rome, which would hardly have asked information about a conspiracy in which they had borne a part; and the nuncio, in a secret despatch, would hardly have spoken in terms of such condemnation of a plot in which his superiors were implicated. These secret despatches were first published almost two centuries after. A solemn *Te Deum* over the event was sung at Rome by the order of Pope Gregory XIII.; but it must be borne in mind that, according to the accounts then at hand, the affair grew out of an unsuccessful conspiracy against the French government and the Catholic church; and the *Te Deum* belonged to the same category with the one sung shortly before for the victory gained at Lepanto over the Turks.—Nuthdorf, a German student who professed to have been an eye witness of the massacre, left a narrative of it in Latin, which has been recently discovered in France, and is said to be in course of publication (1872).

BARTLETT, Elisha, an American physician and author, born in Smithfield, R. I., in 1805, died there, July 18, 1855. He graduated from the medical department of Brown university in 1826, spent a year in Europe, and commenced practice in Lowell, Mass. He delivered the course of lectures on pathological anatomy at the Berkshire medical institute, in Pittsfield, Mass., in 1832, and in 1839 lectured at Dartmouth college. Subsequently he held professorships in Transylvania college, Lexington, Ky. (1841), the university of Maryland (1844), Lexington again (1846), Louisville (1849), and the university of New York (1850); and from 1851 till his death he held the chair of materia medica and medical jurisprudence in the college of physicians and surgeons in New York. While occupied in these different situations during the autumn and winter, he also delivered from 1843 to 1852 the lectures at the Vermont medical college, Woodstock, in the spring and summer. He wrote "Essay on Philosophy of Medical Science" (1844); "Inquiry into the Degree of Certainty in Medicine" (1848); "The Fevers of the United States" (1850); "Discourse on the Times, Character, and Works of Hippocrates" (1852); and a volume of verses entitled "Simple Settings in Verse for Portraits and Pictures from Mr. Dickens's Gallery" (1855); and edited "The Monthly Journal of Medical Literature" at Lowell.

BARTLETT, Ichabod, an American lawyer, born in Salisbury, N. H., in 1786, died in Portsmouth, N. H., Oct. 19, 1853. He was educated at Dartmouth college, and commenced the practice of law in Durham, but soon removed to Portsmouth, where he spent the rest of his life. He is celebrated as an opponent of Webster and Mason. He was seven years in the state legislature, a representative in congress (1823–'9), and a member of the state constitutional convention of 1850.

BARTLETT, John Russell, an American author, born in Providence, R. I., Oct. 23, 1805. He was early placed in a banking house, and was for six years cashier of the Globe bank at Providence. While there he was one of the original projectors of the Providence athenæum and an active member of the Franklin society, before which he occasionally lectured. In 1837 he engaged in business in a commission house in New York, in which he was unsuccessful. He then took part in establishing there the bookstore of Bartlett and Welford, chiefly for the importation of foreign works. He became at this time one of the active managers of the New York historical society, and was a projector of the American ethno-

logical society. In 1850 he was appointed by President Taylor commissioner to fix the boundary line between the United States and Mexico under the treaty of Guadalupe Hidalgo. He remained in this service till Jan. 7, 1853, making extensive surveys and explorations, with elaborate scientific observations; but, for want of the necessary appropriations, the boundary line was not completed by him. In 1854 he published a "Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua." He had previously published a small work on "The Progress of Ethnology" (1847), and a "Dictionary of Americanisms" (1850), since revised and enlarged (1859). He became secretary of state of Rhode Island, May 1, 1855, and has held that office ever since. He has edited and published the "Records of the Colony of Rhode Island and Providence Plantations" (10 vols., 1856–'65), and written "Bibliography of Rhode Island" (1864), "Index to the Acts and Resolves of the General Assembly of Rhode Island from 1758 to 1862" (1863), "Literature of the Rebellion" (1866), "Memoirs of Rhode Island Officers in the War of the Rebellion" (1867), "Primeval Man" (1868).

BARTLETT, Joseph, an American wit, poet, and adventurer, born in Plymouth, Mass., about 1763, died in Boston, Oct. 27, 1827. He graduated at Harvard college in 1782, and began the study of law at Salem, but soon gave it up for a voyage to England. In London, being at the representation of one of Gen. Burgoyne's plays in ridicule of his countrymen, he stood up in the pit and cried out, "Hurrah! Great Britain beaten by barbers, tailors, and tinkers!" with prodigious effect. It was taken in good part, and got him the acquaintance of many of the "bloods" of the day. He gambled, got into prison, wrote a play for his release, and went upon the stage himself. From an actor he became a merchant, and, having sailed for America with a large supply of goods on credit, was shipwrecked on Cape Cod. For a while he figured as captain of volunteers in Shays's war, then opened an office in Woburn, painting it black, and calling it the "Coffin," to attract notoriety. He next removed to Cambridge, and in 1799 delivered a poem on physiognomy before the Phi Beta Kappa society, satirical and clever, and said to touch upon the traits of individuals at the time. To the edition of this poem published in 1823 were appended a number of "Aphorisms on Men, Principles, and Things," the results of his various experience. The same year he delivered a Fourth of July oration at Boston, and afterward recited a poem entitled "The New Vicar of Bray," which obtained considerable celebrity. He attempted the practice of law and of politics in Maine, was elected to the state legislature, and nearly secured an election to congress. He then practised law at Portsmouth, N. H., and closed his improvident life, a burden to his friends, at Boston.

BARTLETT, Josiah, M. D., an American patriot and statesman, born at Amesbury, Mass., in November, 1729, died May 19, 1795. He commenced the practice of medicine in 1750 at Kingston, and established a reputation during the prevalence of the *angina maligna* in 1754 by treatment with Peruvian bark, in opposition to the usage of other physicians. He received several appointments from the royal governor, John Wentworth, but was deprived of them in 1775 for being a zealous whig. In 1774 he was appointed to the command of a regiment of militia. Being chosen delegate to the continental congress, he was the first who voted for, and the first after the president who signed the Declaration of Independence. He accompanied Stark in 1777 to Bennington. In 1779 he was appointed chief justice of the common pleas, in 1784 justice of the supreme court, and in 1788 chief justice. He was an active member of the convention called to adopt the federal constitution in 1788. In 1790 he was president of New Hampshire, and in 1793 was chosen the first governor under the new state constitution.

BARTLETT, William, one of the founders of the theological seminary at Andover, Mass., born at Newburyport, Jan. 31, 1748, died there, Feb. 8, 1841. He made a large fortune in trade, and besides liberal contributions in aid of the temperance reform, foreign missions, and the education of young men for the ministry, he gave $30,000 toward the foundation of the Andover theological seminary, endowed a professorship, and built a house for the incumbent.

BARTLETT, William Henry, an English artist and author, born in London, March 26, 1809, died at sea in September, 1854. He was apprenticed to John Britton the antiquary, and employed by him as a draughtsman. He travelled extensively at home and abroad, repeatedly visiting the East and the American continent, and engraved nearly 1,000 plates from his drawings, with descriptions written by himself, by his fellow traveller William Beattie, and by other hands. The text of his "Beauties of the Bosphorus" (London, 1840) was furnished by Miss Pardoe, and that of "American Scenery" (2 vols., 1840) and of "Scenery and Antiquities of Ireland" (2 vols., 1842) by N. P. Willis. His works on Switzerland, Egypt, and the Holy Land were the most popular, a 4th vol. of his "Footsteps of our Lord and his Apostles" appearing in 1856. A brief memoir of his life, by Beattie, was published in London in 1855.

BARTOL, Cyrus Augustus, an American author and Congregational clergyman, born at Freeport, Me., April 30, 1813. He graduated at Bowdoin college in 1832, completed his theological education at the Cambridge divinity school in 1835, and was settled as colleague pastor with the Rev. Charles Lowell, D. D., of the West church in Boston, March 1, 1837. His principal writings are: "Discourses on the Christian Spirit and Life" (1850); "Discourses on the Christian Body and Form" (1854); "Pictures of Europe" (1855), a work combining

graphic sketches of travel with philosophical reflections; a history of the "West Church and its Ministers;" "Church and Congregation: a Plea for their Unity" (1858); "Word of the Spirit to the Church;" and "Radical Problem" (1872). He has also published a variety of occasional and miscellaneous discourses and essays, besides numerous contributions to the leading periodicals of the day, and several poetical compositions. His writings are characterized by a remarkable individuality of thought and illustration, and a certain antique quaintness of style. Although of a deeply religious tone, they give more prominence to the ethical and social element than to theological doctrine.

BARTOLI, Daniele, an Italian author, born in Ferrara, Feb. 12, 1608, died in Rome, Jan. 13, 1685. He entered the society of Jesus at the age of 15, and was sent to Rome in 1650 to write the history of the order, and in 1671 was appointed rector of the Roman college. His *Istoria della compagnia di Gesù* (5 vols. fol., Rome, 1653–'63; 12 vols., Turin, 1825) is in five parts, three relating to the East, including China, Japan, and Mongolia, one to Italy, and one to England, chiefly in the times of Elizabeth and James I. He wrote also *Vita e Istituto di S. Ignazio* (1689), which has been widely circulated in English; and *L'Uomo di lettere*, also translated into English.

BARTOLI, Pietro Santi, known also as Perugio, an Italian engraver, born about 1635, died in Rome in 1700. He was a pupil of Nicolas Poussin, and imitated his master's works with wonderful fidelity. He excelled chiefly as an engraver, his prints of Greek and Roman works being much valued by Winckelmann. His most celebrated designs are after the Scriptural frescoes of Raphael in the Vatican. His St. John, after Mola, is in the Louvre, and his "Jupiter crushing the Giants," after Giulio Romano, is at Mantua. He completed over 1,000 plates, chiefly etchings, which have become very scarce.

BARTOLINI, Lorenzo, an Italian sculptor, born at Savignano, near Prato, Tuscany, in 1777, died in Florence, Jan. 20, 1850. He took lessons from a French artist in Florence, and went to Paris in 1797, where his bass relief of "Cleobis and Biton" won a prize from the academy. He became a great favorite of Napoleon, who charged him in 1808 with the establishment of an academy at Carrara, from which city he was expelled after the overthrow of the emperor, whom he accompanied to Elba. After the battle of Waterloo he returned to Florence, where he directed the department of sculpture, and was professor in the academy of fine arts. He was regarded in Italy as next to Canova in eminence. He excelled especially by his graceful drapery, and by his exquisite modelling of the flesh. In the Pitti palace at Florence is his masterwork, a marble group representing Charity. Among his numerous other works in that city are statues of the Venus de' Medici and of Machiavelli. At Milan is his statue of "Faith in God," erected by the marchioness Trivulzio in commemoration of her husband; in the cathedral of Lausanne is his monument of Lady Harriet Stratford Canning; and his Bacchante is in the duke of Devonshire's collection in England. In Paris he made busts of Madame de Staël, Lord Byron, the countess Guiccioli, Thiers, and many other prominent persons, besides the monument of Prince Nicholas Demidoff and the marble statues of Arnina, nymph of the Arno (1841), and of "The Nymph with the Scorpion" (1845).

BARTOLO, or **Bartoli. I. Taddeo di,** an Italian painter of the Sienese school, flourished from 1390 to 1414. He was the son and grandson of painters. Some of his pictures are at Pisa, Volterra, and Padua, and one of his celebrated madonnas is in the gallery of the late king Louis I. of Bavaria. His most remarkable fresco painting, in the vestibule of the chapel of the Palazzo Pubblico at Siena, representing celebrated men of antiquity, was imitated by Perugio in the exchange at Perugia. **II. Domenico di,** nephew and pupil of the preceding, was a painter of frescoes (1440), from which Raphael while at Siena derived a knowledge of national costumes. His "Ascension of the Virgin" is in the museum of Berlin.

BARTOLOMMEO, Fra, an Italian painter, whose real name was Baccio della Porta, called also il Frate and Fra Bartolommeo di San Marco, born at Savignano in 1469, died in Florence, Oct. 8, 1517. He studied under Cosimo Rosselli, and acquired his knowledge of chiaroscuro from Leonardo da Vinci. His first works were of small size, such as his two cabinet pictures in the Florentine gallery, representing the "Nativity" and the "Circumcision." In his fresco of the "Last Judgment," in the chapel of Santa Maria Nuova, he adopted a grander style. He was an admirer and friend of Savonarola, whose execution preyed so much upon his mind that in July, 1500, he entered the convent of Prato, and subsequently that of San Marco. But he resumed his profession in 1504, and became intimate with Raphael, whom he instructed in coloring and the folding of draperies, while Raphael taught him the rules of perspective. Subsequently he went to Rome, to study the works of that master and of Michael Angelo. In the convent of San Marco are some of Fra Bartolommeo's most finished frescoes. One of his finest productions, "The Virgin upon a Throne," is in the public gallery of Florence. In the Pitti palace is his single figure of St. Mark, which is described by Winckelmann as a Grecian statue transformed into a picture. In the Quirinal of Rome are two of his pictures, St. Peter and St. Paul. The latter was most admired by Raphael, who completed it. Other famous works of his are to be found in Rome, Naples, Munich, Berlin, and St. Petersburg; and those removed by Napoleon I. to the Louvre have been restored to Florence. His rarest per-

formances are in the possession of the former grand ducal family of Tuscany, including his last and one of his best works, a large picture in chiaroscuro representing the patron saints of the city surrounding the Virgin. His designs came into possession of Sir Benjamin West, and afterward into that of Sir Thomas Lawrence, at whose death they were sold and scattered. He was the inventor of a new method of casting draperies, and of the use of the wooden figure with movable joints. The distribution of light and shadow constitutes the great merit of his art.

BARTOLOZZI, Francesco, an Italian engraver, born in Florence in 1725 or 1730, died in Lisbon about 1815. He was the son of a goldsmith, perfected himself in his art in Venice, Florence, and Milan, and in 1764 accompanied Richard Dalton, librarian of George III., to England, where he was employed in the royal academy, and acquired great celebrity, especially by his "Death of Chatham" after Copley, and by his "Virgin and Child" after Sassoferrato. In 1805 he was called to Lisbon by the prince regent of Portugal, who pensioned him and made him president of the academy of fine arts. He excelled in every species of engraving, and left a prodigious number of plates and etchings; that of Clythia after Annibale Carracci is one of his master-works, and other designs after the Carracci, the "Death of Dido" after Cipriani, and the "Massacre of the Innocents" after Guido, are among his more renowned productions. With Bracci he wrote *Memorie degli antichi incisori* (2 vols., Florence, 1784–'8).

BARTON. I. A N.W. county of Georgia, formerly called Cass; area, 714 sq. m.; pop. in 1870, 16,566, of whom 4,719 were colored. Gold, copper, lead, iron, plumbago, marble, and limestone are found in several places. The surface is much diversified, and occupied in part by forests of hickory, pine, elm, and other trees. The Western and Atlantic railroad traverses the county, and it is drained by Etowah river and its branches. The chief productions in 1870 were 136,647 bushels of wheat, 239,197 of Indian corn, 36,284 of oats, and 2,833 bales of cotton. There were 1,045 horses, 1,682 milch cows, 2,552 other cattle, 4,100 sheep, and 11,794 swine. Capital, Cassville. **II.** A S. W. county of Missouri, on the Kansas border, watered by affluents of the Grand or Neosho and of the Osage river; area, 600 sq. m.; pop. in 1870, 5,087, of whom 19 were colored. The chief productions in 1870 were 21,436 bushels of wheat, 245,460 of Indian corn, 38,347 of oats, and 7,459 tons of hay. There were 1,983 horses, 1,755 milch cows, 3,237 other cattle, 3,337 sheep, and 6,794 swine. Capital, Lamar. **III.** A W. central county of Kansas; area, 900 sq. m.; pop. in 1870, 2. The Arkansas river intersects the S. portion, and its branches, the chief of which is Walnut creek, water the greater part of the county. Fort Zarah is in this county, at the junction of Walnut creek with the Arkansas.

BARTON, Benjamin Smith, an American naturalist, born at Lancaster, Penn., Feb. 10, 1766, died in Philadelphia, Dec. 19, 1815. He was a son of the Rev. Thomas Barton and a nephew of Dr. David Rittenhouse. After his parents' death and after a course of general studies at York, Penn., under Dr. Andrews, he studied medicine and the natural sciences in Philadelphia (1782–'6), and in Edinburgh and London (1786–'8), and took his medical degree in Göttingen in 1788 or 1789. Subsequently he practised his profession in Philadelphia, and became professor of botany and natural history, retaining this position after the incorporation of the college with the university in 1791. He received the chair of materia medica in 1795, and succeeded Dr. Rush in that of the theory and practice of medicine. He was president of the Philadelphia medical society, vice president of the American philosophical society, a member of many other American and European societies, and a correspondent of Humboldt and other savants. Among his works are: "Elements of Botany" (2d ed., 2 vols., 1812–'14); "Collections for an Essay toward a Materia Medica of the United States" (3d ed., 1810); *Flora Virginica* (1812); and numerous other writings, chiefly relating to natural history, and on medical, philological, and archæological subjects.—His nephew, WILLIAM P. C. BARTON, M. D., succeeded him in the chair of botany, and died in 1856. He wrote "Memoirs" of his uncle, "Flora of America" (3 vols., 1821–'3), "Vegetable Materia Medica of the United States, or Medical Botany" (illustrated, 1817–'25), and other works.

BARTON, Bernard, an English poet, born in London, Jan. 31, 1784, died at Woodbridge, Feb. 19, 1849. He was a member of the society of Friends, and a bank clerk at Woodbridge from 1810 to 1847. His work entitled "Metrical Effusions" (1812) was followed by others, which, though deficient in poetical power, were animated with tender and devotional feeling, and gained for him the regard of Southey, Lamb, and Byron, and a donation of £1,200 from a reading club which he had established at Woodbridge, besides a pension of £100 accorded to him in the latter part of his life through Sir Robert Peel. His poems fill 8 or 9 volumes, the "Household Verses" being among his latest and best productions. His sister Maria Hack wrote many juvenile works, and his daughter Lucy published in 1849 "Selections from the Poems and Letters of Bernard Barton."

BARTON, Elizabeth, called the Holy Maid or the Nun of Kent, an English religious impostor, executed April 21, 1534. She was a servant, who when seized with nervous fits broke out in ravings, of which her parish priest, Masters, took advantage in 1525 to represent her as an inspired prophetess. In 1531 she was induced by Father Bocking to take the veil at Canterbury for the sake of additional effect, he prompting her to denounce the reformation,

and especially Henry VIII. on account of his proposed divorce from Queen Catharine. Even Sir Thomas More and Bishop Fisher of Rochester countenanced the imposture for a time, and the excitement among the populace became so obnoxious to the authorities that she was arrested in 1533. She made a confession of the conspiracy at St. Paul's cross in December. A bill of attainder against her and her accomplices, including Masters, Bocking, Deering (who wrote a work on her revelations and prophecies), and two other persons, was passed on March 6; and she was beheaded with them at Tyburn.

BARTON, William, an American soldier, born in Providence, R. I., about 1747, died there, Oct. 22, 1831. He was a lieutenant colonel in the state militia when, on the night of July 20, 1777, he crossed Narragansett bay with a small body of men, passed unnoticed three British frigates, landed between Newport and Bristol ferry, reached the house where the English general Prescott was sleeping, and with the assistance of a negro, who broke in a panel of the door with his head, made his way into the room and took him prisoner. For this exploit he received from congress the gift of a sword, a commission as colonel, and a tract of land in Vermont. He retired from active service in August, 1778, after having been wounded at Bristol ferry, and was a member of the convention which adopted the constitution. By some illegality in the transfer of a portion of his Vermont land Barton was involved in difficulties, and for several years imprisoned for debt in Vermont till 1825, when Lafayette paid the claim against him. Mrs. C. M. Williams included a life of Barton in her "Biography of Revolutionary Heroes" (Providence, 1839).

BARTRAM. I. John, an American botanist, born at Marple, Delaware county, Penn., in 1701, died in September, 1777. His grandfather was one of the companions of William Penn. He himself supported a large family by his industry as a farmer; but by unremitted application he mastered the rudiments of the learned languages, and made such proficiency in botany that he was pronounced by Linnæus the greatest natural botanist in the world. He made excursions through many regions of North America at a time when they were covered with forests, and he was the first to describe particularly their natural productions. In 1743 he visited the shores of Lake Ontario, and in 1765 explored the region of the river St. John's in Florida; and in both of these excursions he collected many beautiful plants and trees, which he sent to enrich the gardens of Europe. He was supplied by Linnæus, Sir Hans Sloane, and others, with books and apparatus, and he in return sent them specimens of new and curious American plants. He founded on the bank of the Schuylkill, a few miles below Philadelphia, the first botanic garden in America, where he cultivated beautiful and rare American and exotic plants. At the time of his death he was a fellow of several foreign learned societies, and bore the title of American botanist to George III. of England. He published an account of his observations during his travels, and contributed to the British "Philosophical Transactions" several papers on scientific subjects. See "Memorials of John Bartram and Humphrey Marshall," by Dr. William Darlington (Philadelphia, 1849). **II. William,** son of the preceding, born at Kingsessing, Penn., in 1739, died July 22, 1823. He commenced life as a merchant, but accompanied his father to East Florida and settled on the banks of the river St. John's. In 1771 he returned to Kingsessing, but in 1773, at the request of Dr. Fothergill of London, he made a second scientific journey to Florida, and also to the Carolinas and Georgia. The narrative of his expedition, under the title of "Travels through North and South Carolina, East and West Florida, the Cherokee Country, &c.," was published in Philadelphia in 1791, and in London in 1792, and again in 1794 with illustrations (French translation by P. V. Benoist, 2 vols., Paris, 1801). One of his essays, written in 1789, was published in 1853, in vol. iii. of the "Transactions of the American Ethnological Society," under the title of "Observations on the Creek and Cherokee Indians." In 1782 he declined the chair of botany in the university of Pennsylvania, on account of his impaired sight. He made known and illustrated many of the most curious and beautiful plants of North America, and published the fullest list of American birds previous to Wilson, whom he greatly assisted at the outset of his labors.

BARTSCH, Johann Adam Bernhard von, a German engraver, born in Vienna, Aug. 17, 1757, died there, Aug. 21, 1821. He rose to the highest eminence in his art, and became a member of the academy of fine arts and director of the imperial collection of engravings. He wrote *Le peintre-graveur* (21 vols., Vienna, 1802–'21), one of the best accounts of prints ever published, and *Catalogues raisonnés* of the works of Rembrandt (2 vols., 1797) and other great artists. The catalogue of his own productions, comprising over 500 prints, was published in 1818 by his son Friedrich Joseph Adam von Bartsch, born July 12, 1798, who succeeded him as director.

BARTSCH, Karl Friedrich, a German philologist, born at Sprottau, Feb. 25, 1832. He graduated at Halle in 1853, was director of the library of the German museum at Nuremberg 1855–'7, and professor at Rostock 1858–'71, when he succeeded Holtzmann in Heidelberg. He has written much on ancient German and French literature, and translated Burns into German (1865). Among his principal works are his critical edition of the *Nibelungenlied* (Leipsic, 1870) and his *Grundriss zur Geschichte der Provenzalischen Literatur* (1872). He has edited the *Germania* since 1869.

BARUCH (Heb., blessed), the son of Neriah, a friend and amanuensis of the prophet Jere-

miah, whose captivity he appears to have shared, and whom he accompanied to Egypt. His subsequent fate is unknown. He wrote from dictation the prophecies of Jeremiah, and read them to the people from a window of the temple (about 605 B. C.); but King Jehoiakim, being displeased with the contents, destroyed the roll, cutting it with a penknife and afterward burning it. Concealing themselves from the persecutions of the king, Baruch and Jeremiah rewrote the whole of the prophecies. The enemies of Jeremiah ascribed to the latter an important influence upon the prophet. Bunsen regards Baruch as the author of the second part of Isaiah.—One of the apocryphal books of the Old Testament bears the name of Baruch. It follows in the Septuagint immediately after the prophecy of Jeremiah. The prologue of the book states that it was read by Baruch to Jeremiah and the people in Babylon by the river Sud (Euphrates); that the people were brought by it to repentance, and sent the book with a letter and presents to Jerusalem. Then follows an exhortation to wisdom and a due observance of the law. Jerusalem is introduced as a widow comforting her children with the hope of a return. The Roman Catholic theologians generally defend the authenticity of the book, while most of the Protestants regard its spuriousness as fully proved. The first portion of the book, embracing chap. i. to iii. 8, is, according to the unanimous opinion of all writers, a translation from a Hebrew original; according to Ewald and Hitzig, the translation was made by the Alexandrine translator of Jeremiah. The remainder is believed to have been written by a Greek author. Ewald thinks it was composed between 360 and 350 B. C.

BARY, Hendrik, a Dutch engraver of the 17th century. His productions are remarkable for neatness of execution, though inferior to those of Cornelius Vischer. Among them are excellent engravings of the portrait of Grotius, of several Dutch admirals, and of an allegorical picture by Vandyke, representing "Summer and Autumn."

BARYE, Antoine Louis, a French sculptor, born in Paris, Sept. 24, 1795. He perfected his studies under Bosio and Gros, and acquired reputation in 1831 by his group representing a tiger and a crocodile, in M. Thiers' possession. In 1848–'51 he held an office in the Louvre museum, where he also had his studio. In 1850 he became a teacher of the art of designing subjects in natural history at Versailles, and afterward taught in the Louvre from 1854, and in the museum of the botanical garden from 1856. He executed allegorical statues for the pavilion of the new Louvre; produced many works relating to mythological and historical subjects; statuettes of Gaston de Foix, Napoleon, and Charles VI. (the last executed after his model by the late princess Marie d'Orléans); the "Three Graces," the "Amazon," "Angelica," two of his daughters (since dead), and other fine female figures. His works most admired for their anatomical and physiological qualities and monumental grandeur are his bronze groups of animals, as his lion crushing a boar, and his other lions in the garden of the Tuileries; his panther and gazelle in the collection of the duke de Luynes; his little bears playing; his tiger devouring a goat in the Lyons museum; and his jaguar feasting upon a hare, purchased as a plaster model by the French government in 1850, and exhibited in bronze at the Paris expositions of 1852 and 1855. In 1833 he became chevalier and in 1855 officer of the legion of honor; received the gold medal of honor at the exhibition of 1855; took a prominent part in the London exhibition of 1862; and in 1868 became a member of the academy of fine arts. Gonon's revival of the renaissance method of modelling bronze statues at the first casting from waste wax (*cire perdue*) is successfully applied to many of Barye's works.

BARYTA, or Barytes. See BARIUM.

BAS, or Batz, a small island of France, in the English channel, a part of the department of Finistère, 15 m. N. W. of Morlaix, about 2½ m. long and nearly 2 m. wide; pop. about 5,000. It contains three villages, four batteries, two forts, a revolving lighthouse, and a safe harbor of refuge.

BASALT, the hardest, most compact, and heaviest of the trap rocks, frequently columnar in structure, the columns or prisms having three, five, or more sides, regular and jointed. Some of the columns of the isle of Skye are 400 feet long, while in other localities they do not exceed an inch in length. The diameters of the prisms range from nine feet to an inch across the face. The columnar structure is most noticeable when the rock is viewed at a distance, as at the Palisades on the Hudson. Remarkable examples of basalt have been found on the N. W. shore of Lake Superior, at the Giant's Causeway, Ireland, and Fingal's cave, Scotland, and on the island of St. Helena. Basalt belongs to the augitic series of the igneous rocks resembling dolerite, and consists of labradorite, augite, and chrysolite in grains looking like green glass. Its specific gravity varies from 2·9 to 3·2. Owing to its hardness, basalt has been much used for pavements and for macadamizing roads. When melted and cooled rapidly it is converted into a kind of obsidian (volcanic glass), and can be cast into ornamental blocks and mouldings. Artificial building stone was at one time made of it in England.

BASARJIK (Turkish, market town), the name of several places in European Turkey, the most important of which are the two following. **I.** Also called Hadji-Oglo-Basari, in eastern Bulgaria, 25 m. N. of Varna; pop. about 5,000, mostly Mohammedans. The town contains 10 mosques, and has an important yearly fair in April. It was captured by the Russians, June 2, 1774, and again June 3, 1810, after an obstinate struggle in which 8,000 Turks fell. **II.** Also called Tatar-Basarjik, on the upper

Maritza, in the eyalet of Adrianople, 20 m. W. N. W. of Philippopolis. It contains 4,000 or 5,000 houses, about three fourths of which are occupied by Mohammedans and one fourth by Bulgarian Christians. The town has 18 mosques, 5 churches, and a yearly fair lasting from the beginning of June to the middle of August. Rice culture and the trade in that article are important branches of industry. There are also warm springs and baths.

BASCHI, Matteo, an Italian Franciscan, founder of the Capuchins, died in Venice in 1552. He was a Minorite friar of the convent of Montefalcone, when he declared that St. Francis had appeared to him in a vision, and commanded him to introduce into the order the same costume which the saint had worn in life, namely, a robe of flannel, of a chestnut color, tied with a cord for a girdle, a short flannel cloak, and a large hood. Pope Clement VII. accepted the revelation, and gave Baschi and those who wished to imitate him permission to form a separate congregation, which soon took the name of Capuchins (*capote*, a hood). Baschi met with much opposition from his brethren, and was for a short time imprisoned; but he finally became the first general of the Capuchin branch of the Franciscans.

BASCOM, Henry Bidleman, D. D., LL. D., an American clergyman, bishop of the Methodist Episcopal church South, born May 27, 1796, in Hancock, Delaware co., N. Y., died in Louisville, Sept. 8, 1850. Before the age of 18 he received license to preach, and was admitted to the Ohio conference. After several years of hard work on frontier circuits, he was transferred to the Tennessee conference in 1816, returned to the Ohio conference in 1822, and in 1823, through the influence of Henry Clay, was elected chaplain of the house of representatives at Washington. In 1824 he was stationed at Pittsburgh, in 1825 was made conference missionary, and from 1827 to 1828 was president of Madison college, Uniontown, Penn. From 1829 to 1831 he served as agent of the colonization society, and then was appointed to the chair of moral science and belles-lettres in Augusta college, Kentucky, where he remained till 1841. He declined the presidency of Louisiana college and of the Missouri university to accept that of Transylvania college, Kentucky (1842). He was the author of the celebrated protest of the southern delegates to the general conference against the action of the majority in the case of Bishop Andrew (1844), was also a member of the convention of southern delegates held in Louisville, Ky., in May, 1845, and drew up the report of the committee on the organization of the church South. After serving as editor of the "Quarterly Review" of the M. E. church South (1846–'50), and chairman of the board of commissioners to settle the controversy between the northern and southern divisions of the church, he was elected to the episcopal office a short time before his death. His works (4 vols. 8vo, Nashville, 1850 and 1856) comprise sermons, addresses, lectures, and essays on infidelity, mental and moral science, moral and political philosophy, &c., and "Methodism and Slavery," a defence of the southern branch of the church. As a pulpit orator, Dr. Bascom was singularly fervid and powerful, and the fame of his eloquence was scarcely surpassed by that of any other public speaker in church or state. His biography has been written by the Rev. M. M. Henkle (12mo, Nashville, 1854).

BASCOM, John, an American scholar and author, born at Genoa, N. Y., May 1, 1827. He is a graduate of Williams college and of Andover theological seminary, and has been since 1855 professor of rhetoric in the former institution. He has published a treatise on "Political Economy" (1861); "Treatise on Æsthetics" (1862); "Text Book of Rhetoric" (1865); "Elements of Psychology" (1869); and "Science, Philosophy, and Religion" (1871), a series of lectures delivered before the Lowell institute, Boston, in the winter of 1869–'70.

BASE, in chemistry, a term used with several applications, varying according to the view taken of the constitution of compounds. As originally used in the exposition of the dualistic hypothesis, it signified the electro-positive oxide, sulphide, &c.; but in the new unitary hypothesis it must be applied to those electro-positive elements or compound radicals which can be substituted for the hydrogen of acids. Alkalies and some other metallic oxides were formerly regarded as comprising all the strictly defined bases; but to these are now added a large class of organic substances existing in plants, which with acids form salts, and may be separated by the greater affinity of the acid for stronger bases. These vegetable bases or alkaloids consist of oxygen, hydrogen, and carbon, in combination with a certain proportion of nitrogen. The constant presence of this element has led to the supposition that the salifiable properties of these compounds may be attributed to it. The vegetable bases are usually in white crystals. The few animal bases or alkalies are volatile, liquid, and of oily consistency. The medicinal properties of plants reside in the bases extracted from them. A crystal of aconitine contains the concentrated strength of numerous plants of the monkshood; and one of morphia combines that of a large quantity of opium, as one of quinine does of Peruvian bark. (See Alkali, Alkaloid, and Salt.)

BASE BALL, an athletic game played in the United States, where it has, as a national amusement, a prominence almost equal to that attained by cricket in England. It has reached its present importance only within the last 10 or 15 years, though it was long before played in some parts of the country, and is indeed probably derived from an old English game called "rounders." It is played with a hard ball, composed of yarn tightly wound around a piece of vulcanized rubber, and a round wooden bat not more than 42 inches in length.

The ball must not weigh less than 5 nor more than 5¼ ounces avoirdupois, and must be between 9 and 9¼ inches in circumference. The bat must not be more than 2½ inches in diameter in the thickest part.—A base ball ground should be a level area of fine turf about 600 ft. in length by 400 in breadth, at one end of which a square of 90 ft. is marked out. At the lower angle of this, designated as the home base, is fixed a white iron plate or stone, while the other angles are indicated by white canvas bags filled with sawdust and attached to posts, or more commonly iron pins, sunk in the ground. Nine players constitute a side, one side taking the bat and the other the field. The batsman stands at the home base, having the pitcher opposite to him, at the distance of 45 ft., and the catcher behind. A player is also stationed at or near each of the three canvas bags, known as the first, second, and third

bases, and which are respectively on the right, opposite to, and on the left of the batsman. Besides these, there is a short field, called the short stop, behind the pitcher, and a right, centre, and left field at a considerable distance in the rear of the second base, the duties of all of whom are to catch or stop the balls and return them to the pitcher or the basemen. The positions of the players as well as those of the bases will be understood by reference to the annexed diagram. A captain, who is generally the catcher, assigns the places of the players on his side and directs the game. One or two definitions must precede a description of the actual game. The batsman may strike a ball in two ways, "fair" and "foul." It is a fair ball when it is struck in a direction lying within the lines of range of the home and third base, or of the home and first base—supposing those lines indefinitely continued in the direction of the field—and when it first touches the ground, a player, or any object within those lines. It is a foul ball when struck outside those limits, either to the right, left, or rear of the batsman.—The actual form of play is as follows: When the batsman has struck a fair ball, or when he has struck three times at any fairly delivered ball and missed it each time, he must start for the first base; from which it is his object to reach in turn, as he has opportunity, the second, third, and again the "home." When he succeeds in reaching the home base without being put out, and after having successively touched the first, second, and third bases, he is entitled to score one run. As soon as each batsman begins to run the bases, he is succeeded at the bat by another player of his own side, the succession continuing until three players of the side are out, when the side goes to the field, and their adversaries take their innings. A player may be put out in the following different ways: 1, if while he is acting as batsman a fair ball struck by him be caught by an adversary before it touches the ground; 2, when a foul ball struck by him is either so caught, or caught on the first bound; 3, if a fair ball struck by him is held by his adversary on the first base before he reaches that base; 4, if he strikes three times at fairly delivered balls, misses each time, and each time the ball is caught by the catcher, or if, after so striking, the ball is held by the player on first base before he can reach it; 5, if while running the bases he is touched by the ball, while in play, in the hands of an adversary, at a time when no part of his person is touching any base; 6, if he wilfully breaks certain important rules concerning details of play, or attempts to frustrate by any improper means a legitimate attempt to put him out—by knocking the ball from the hand of a player, or in other ways. A ball is said to be out of play after a foul stroke, until it has been returned to the hands of the pitcher. Nine innings are played on each side, and the party making the greatest number of runs wins the game.—The rules observed throughout the country in playing the game are those agreed upon by the two national associations of base ball players—one of professional players, so called, and the other of amateurs. Representatives of the different clubs belonging to these meet annually in convention, revise the rules of play, settle contested points, &c.; and reference may be made to their code of regulations, printed in all base ball players' manuals, for further information concerning the details of the game.

BASEDOW, Johann Bernhard, a German reformer of education, born in Hamburg in September, 1723, died in Magdeburg, July 25, 1790. He was the son of a wig maker, and a pupil in the Hamburg gymnasium, where he was encouraged in his studies by Reimarus. Subsequently he spent several years at the university of Leipsic and became a professor. Rousseau's *Émile* having produced a strong impression upon his mind, he came forward in 1768 in favor of a thorough reform in education, and received assistance for the publication of his *Elementarwerk* (3 vols., 1774; translated

into French and Latin), with 100 of Chodowiecki's plates, illustrating natural sciences and industry. This became the model of many school books of the kind, imparting varied information in a cosmopolitan and liberal spirit. Under the auspices of Prince Francis Frederick of Anhalt-Dessau, he opened at Dessau in 1774 the *Philanthropin*, a school free from sectarian bias and from corporal punishment, and designed to deliver public instruction from mediæval bonds, to prepare pupils for higher academical studies without pedantry or bigotry, to introduce gymnastic exercises, and to impart a knowledge of modern as well as of ancient languages. This school led to the establishment of many similar ones, though Basedow himself withdrew from it in 1778. He was charged with not duly appreciating the advantages of a thorough classical and of an orthodox religious training; but he was nevertheless regarded as a most effective and philanthropic reformer.

BASEL (Fr. *Basle* or *Bâle*). **I.** A canton of Switzerland, which since 1833 has been divided into two half cantons, called Basel City and Basel Country (Ger. *Baselstadt* and *Baselland*); area of both, 176 sq. m.; pop. in 1870, 101,887. It is bounded by Alsace, Baden, and the cantons of Aargau, Solothurn, and Bern. The northern chains of the Jura here descend into the plains of the Rhine, which are about 700 ft. above the level of the sea, the highest elevation being 3,800 ft. The country is hilly but fertile, and the climate mild, the cold northern winds being intercepted by the mountains. The canton has no lakes; the Rhine is the only considerable river, though there are numerous small streams. Coal and salt are the only minerals. The agricultural products present but little variety. Cattle, hides, butter, cheese, and cherry brandy are exported. There are considerable manufactures of iron, copper, steel, silk, linen, leather, and paper; the dyeing and bleaching factories are noted.—The city half canton has an area of 14 sq. m.; pop. in 1870, 47,760, of whom 34,455 were Protestants, 12,301 Catholics, 516 Israelites, and 488 of other sects. It had in 1865 a revenue of 1,205,988 fr.; the expenditures were 1,529,373 fr.; the public debt was 5,987,885 fr., while the value of the public domain was estimated at 2,951,386 fr. The country half canton, the capital of which is Liestal, is divided into four districts; area, 162 sq. m.; pop. in 1870, 54,127, of whom 43,523 were Protestants, 10,245 Catholics, 131 Israelites, and 228 of other sects. The yearly expenditure is about 550,000 fr.; the public debt in 1867 was 824,000 fr.; while the value of the property of the canton was estimated at 2,951,386 fr. The inhabitants of both half cantons are purely Teutonic, but generally speak a mixed Franco-German dialect. **II.** A city, the capital of the half canton of which it forms the largest part, situated on the Rhine, 43 m. N. N. E. of Bern; pop. in 1870, 44,834. It is divided into Great Basel on the S. and Little Basel on the N. bank of the river, connected by a wooden bridge 580 feet long. The city is surrounded by unimportant fortifications, and contains a cathedral, built on the spot where stood the Roman fortress of Basilia, a university, a public library containing paintings by Holbein, the hall where the council of Basel was held, and other public buildings, among which are many educational institutions, toward the maintenance of which one-fifth of the public revenue is applied. Basel is the most important manufacturing and commercial town in Switzerland, and the wealth of its citizens is proverbial. The ribbon manufacture, which gives employment to about 3,000 persons, is the principal branch of industry. There were formerly extensive manufactures of paper and leather, but these have declined within a few years, and are nearly abandoned.—The city was founded by the Romans, by whom it was called Basilia or Basiliana. It was destroyed in the wars between the Romans and Germans, and rebuilt in the early part of the 10th century by the German emperor Henry I., when it became the residence of a bishop, and belonged for some time to Burgundy, but after 1032 to the German empire. The territorial dominion belonged partly to an imperial bailiff, partly to

Basel.

the bishop, whose see extended over other localities, and partly to nobles of the rural districts and to patrician families. The latter gradually became sole proprietors until they joined the Swiss confederation; the country nobility emigrated or were embodied among the patricians, and the bishop emigrated with his chapter to Solothurn, when after 1519 the city embraced with ardor the reformed faith. Thus the whole political sway was left with the patricians and trading corporations, who in time became omnipotent over the peasants, and reduced them and the poorer citizens to subjection, against which the latter often but in vain rebelled. The first French republic gave social equality to all classes, while a contribution of 11,000,000 francs was levied upon the city. The dissatisfaction with the restoration of the ancient prerogatives of the privileged city classes led in 1831 to several bloody battles between the soldiery of the city and the peasants, until the Swiss confederation intervened and in 1833 acknowledged the independence of the rural canton. At Basel was signed the treaty of peace between the French republic and Prussia, April 5, and that between the French republic and Spain, July 22, 1795. The population of the city, which was much larger in the middle ages, was in the middle of the 14th century greatly reduced by the "death of Basel," or "black death."

BASEL, Council of, one of the œcumenical councils of the Roman Catholic church. Properly speaking, the councils of Basel, Ferrara, and Florence constitute but one council, of which several sessions were held in each of these cities, and which is usually called the council of Florence, because the most important questions were definitely settled and the council terminated at this latter city. The council during its sessions at Basel, until its transfer to Ferrara in 1437, was acknowledged as œcumenical by Eugenius IV., and its decrees were confirmed by him, with the exception of those which interfered with the prerogatives of the holy see. The principal reasons for assembling a general council at the period referred to were to effect the reconciliation of the Greek church, and to reform ecclesiastical discipline. The council was summoned by Pope Martin V. to meet at Basel, March 3, 1431. Meanwhile he died, and Eugenius IV. was elected to succeed him on the very day of the indiction of the council, and immediately confirmed the acts of his predecessor convoking it. On the day appointed not a single bishop, and but one abbot, appeared at Basel. The last-mentioned person went through the form of declaring himself assembled in œcumenical council. Five days afterward four deputies, together with the first-named abbot and a few clergymen of the city, opened the council solemnly a second time. In September Cardinal Julian Cesarini, the papal legate, arrived at Basel, and sent letters to different prelates exhorting them to come to the council. On Sept. 26 he held a session, at which it is said three bishops and seven abbots were present. The cardinal having sent an envoy to Rome to represent the state of things at Basel, Pope Eugenius IV., who desired to convoke the council in a place more convenient to the Greeks, sent a bull to his legate empowering him to dissolve the council and indicate a new one at Bologna. Cardinal Julian, who at first seemed disposed to dissolve the council, had however changed his mind, and was desirous to continue it. His principal reason appears to have been that he thought it would be a favorable opportunity for treating with the Hussites and reconciling them to the church. He himself had been lately in Bohemia on a legation from the holy see, and was more interested in this matter than in the affairs of the Greek church. This reason, however, made Eugenius still more desirous to transfer the council, as the affair of the Hussites had been once definitely settled at the council of Constance, and he did not wish it to be reopened. His legate, however, was determined if possible to continue the council at Basel; and when he had collected a sufficient number of prelates, the charge of provoking a schism deterred the pope from pressing violently his own wishes. But on Dec. 11, 1431, the pope published a bull dissolving the council of Basel. The cardinal legate obeyed, and declared that he could no longer act as president of the council. Nevertheless he exerted himself in the most energetic manner to induce the pope to revoke the bull, as did also the small number of prelates who were assembled. In these efforts they were supported by several sovereigns. After vainly endeavoring to effect an amicable transfer of the council, Eugenius IV. finally revoked his former bull, and on Feb. 14, 1433, published another, authorizing the continuance of the council at Basel. Meanwhile, however, the prelates had not ceased to continue their sessions, and to style themselves an œcumenical council, although the approbation of the pope was withdrawn from them, and the cardinal legate had ceased to preside. In this they justified themselves by the act of the council of Constance declaring its supremacy over the pope (1415); an act, however, which canonists regard as only intended to apply to contending claimants of the papacy, and as not synodical because the council was only recognized at the time by a part of the church. During the period of the suspension of the council by Eugenius IV., the prelates, who after a time increased to the number of 30, framed several decrees, declaring the superiority of a general council to the pope, the want of power in the latter to dissolve or transfer it, citing Eugenius to appear within a certain time, &c. After the revocation of the bull of transfer, all these edicts were revoked by the council, and the legitimate sessions recommenced under the presidency of

the legate. The declaration of the superiority of a general council to the pope was renewed, however, after the reconciliation, though the legate refused to be present, or sanction the act in any way. A number of decrees of reformation were framed, which are all the acts of the council ever recognized as truly synodical, and as such approved by the holy see. Great efforts were made to enter into negotiations with the Greek emperor, though without success. Finally, Eugenius IV., finding Cardinal Julian, the principal sovereigns, and the Greek emperor, altogether disposed to enter into his views, on June 19, 1437, dissolved once more the council of Basel, and transferred the sessions to Ferrara. There had been from the outset at Basel but few prelates and bishops of high rank, and a great number of the inferior clergy, all of whom had been admitted to a vote in violation of the canons. The cardinals and the principal portion of the prelates of rank obeyed immediately the mandate of the holy see, and repaired to Ferrara. The patriarch of Aquileia, the archbishops of Arles and Palermo, with a few other prelates, and several hundred priests, remained, and continued the sessions of their so-called council, from this time regarded as a *conciliabulum* or schismatical assembly. They declared several propositions respecting the superiority of general councils to be articles of faith, excommunicated the council of Ferrara, deposed the pope, and in 1439 elected Amadeus VIII., formerly duke of Savoy, who took the name of Felix V., and continued to bear it during 10 years, after which he abdicated it, and submitted himself to Nicholas V., who made him cardinal. The council of Basel continued its sessions during all this period, and finally the *débris* of the council, which had adjourned to Lausanne, put an end to itself by electing the reigning pontiff, Nicholas V., pope.

BASEVI, George, an English architect, born at Brighton in 1794, died at Ely, Oct. 16, 1845. He was a pupil of Sir John Soane, and travelled in Greece and Italy. In 1819 he commenced practice in London on his own account with great success. Belgrave square was erected from his designs. He was joint architect with Mr. Sidney Smirke of the conservative club house, St. James's street, a beautiful building. His best and greatest work, the Fitzwilliam museum at Cambridge, was finished by Mr. Cockerell. While inspecting the west bell tower of Ely cathedral, then being restored under his direction, he fell through an aperture a distance of 40 feet, and was killed.

BASHAN, in Biblical geography, the northern portion of trans-Jordanic Palestine, between Damascene Syria on the north and Gilead on the south. It is a high table land, and was anciently famous for the fertility of its soil, and for its oaks, which vied with the cedars of Lebanon. Remains of these forests are still seen in some of the mountainous districts. The deep, rich, black soil on the plains produces the same luxuriant pasture as in ancient times, and the flocks and herds reared there may still be called the fatlings of Bashan. It was conquered from the Amorites in the bloody battle of Edrei, where Og, the giant king of Bashan, fell. It was occupied by the nomadic half tribe of Manasseh. Later it was captured from Israel, after the revolt of the ten tribes, by Hazael, king of Syria, and afterward recaptured by Jeroboam II. It was also the first province that fell before the Assyrian invaders. When the Israelites were taken captive, the scattered remnants of the aboriginal inhabitants, who had settled among the rocky passes of Argob and Hermon, and in the desert, returned. Henceforth it is not mentioned under its name of Bashan by any writer, but the provinces into which it was divided are often referred to. Gaulanitis was the territory of Golan, the ancient Hebrew city of refuge. Auranitis is the Greek name of the Hauran of Ezekiel. Batanæa is the name given to the eastern mountain range, and occasionally used for Bashan in general; and Trachonitis, the rocky region of the north, is a Greek translation of the ancient Argob, the rocky. During the siege of Jerusalem by the Romans, the Christians living in that city retired to Pella, a town of Bashan; and in the 4th century nearly all the inhabitants of the country were Christians. Heathen temples were converted into churches, and churches were built in almost every town and village. When the Saracens overran Syria these churches were converted into mosques; and when the country fell into the power of the Ottomans its desolation was completed. The mountains of Bashan, though not generally very steep, are rugged and rocky. The remains of terraces are still to be seen on the slopes, which give evidence of past industry, and oaks and other forest trees and shrubs abound here. The whole mountain range is of volcanic origin; the peaks shoot up conically in deep serried lines, and the rocks are black. One or two craters of extinct volcanoes have been seen on the plain. The ancient province of Trachonitis, now Lejah, is a vast field of basalt in the midst of the plain of Bashan. In Argob, one of the provinces of Bashan, 30 m. long by 20 broad, Jair is said to have taken no fewer than 60 great and fenced cities. A late traveller, Cyril Graham, writes: "We find one after another great stone cities, walled and unwalled, with stone gates, and so crowded together that it becomes almost a matter of wonder how all the people could have lived in so small a place. When we see houses built of such huge and massive stones that no force which can be brought against them in that country could ever batter them down; when we find rooms in these houses so large and lofty that many of them would be considered fine rooms in a palace in Europe; and lastly, when we find some of these towns bearing the very names which cities in that country bore before the Israelites came out of Egypt, I think

we cannot help feeling the strongest conviction that we have before us the cities of the Rephaim of which we read in the book of Deuteronomy." Porter visited and passed by more than 30 cities and towns, and saw many others dotted over the plain. In his description of one of the houses of the aboriginal inhabitants he says: "The house seems to have undergone little change from the time that its old master left it, and yet the thick nitrous crust on the floor showed that it had not been inhabited for ages. The walls were perfect, built of large blocks of hewn basalt, without cement of any kind. The roof was formed of large slabs of the same black basalt, lying as regularly and joined as closely as if the workmen had just completed them. They measured 12 ft. in length, 18 inches in breadth, and 6 inches in thickness. The end rests on a plain stone cornice projecting about a foot from each side wall. The outer door was a slab of stone 4½ ft. high, 4 wide, and 8 inches thick. It hung upon pivots formed of projecting parts of the slab working in sockets in the lintel and threshhold; and though so massive, it could be opened and shut with ease. At one end of the room was a small window with a stone shutter. An inner door, also of stone, but of finer workmanship, and not quite so heavy as the other, admitted to a chamber of the same size and appearance. From it a much larger door communicated with a third chamber, to which there was a descent by a flight of stone steps. This was a spacious hall, equal in width to the two rooms, and about 25 ft. long by 20 high. A semicircular arch was thrown across it, supporting the stone roof; and a gate so large that camels could pass in and out opened on the street. The gate was of stone and in its place." Some of these cities were supplied with water from distant springs by means of aqueducts. Desolation reigns everywhere; the cities are deserted, and the limited number of Druses and refugees who have settled there raise no more than is indispensable for sustenance, out of fear of arousing the rapacity of an arbitrary government and attracting the Bedouin robbers. (See Bozrah.) The principal authorities on Bashan are J. L. Porter ("Damascus," "The Giant Cities of Bashan," &c.) and Wetzstein (*Reisebericht über Hauran und die Trachonen*, Berlin, 1860).

BASHAW. See Pasha.

BASHKIRS, or **Bashkurts,** uncivilized tribes of Russia, scattered from the Caspian to the boundary of Siberia, chiefly W. of the Ural mountains, and inhabiting large tracts of land (together about 50,000 sq. m.) in the governments of Perm, Ufa, Orenburg, Samara, and adjoining parts; total number about 500,000. They are of remote Finnish origin, but considerably mixed with Tartars, and have their local organizations of cantons, clanships, yurts, and villages, though they have been under Russian authority since their final subjugation about the middle of the 18th century. They are under the ecclesiastical jurisdiction of the Mohammedan Tartar mufti of Ufa, and are nominally Sunnite Mohammedans, but addicted to paganism. They have many of the Tartar and Kirghiz characteristics, but although semi-savages, they are docile and inoffensive. About 50,000 of them are employed in the Russian cavalry service, and the whole race are relieved from paying taxes. They are excellent horsemen and eat horse flesh, and their horses, famous for endurance, are highly valued. In the war of 1812 the Bashkirs, though inferior to the Cossacks, rendered good service. In the Crimean war they were chiefly employed in rough work connected with the transportation of provisions and material. Some of them reside in permanent villages, cultivating the soil,

and raising cattle and bees; others are nomads, wandering from place to place with their flocks and herds, which are numerous, a rich man sometimes having 2,000 sheep and 500 head of cattle. About 400 schools have been established among them, which are attended by about 8,000 children.

BASIL, a name applied to various odoriferous labiates, but especially to the genus *ocymum*. The species of this genus number about 40, and are chiefly indigenous to the East Indies, where some species are regarded with superstitious veneration from their supposed power as disinfectants. Basil has been cultivated in many parts of Europe and America as a garden herb, useful in cooking for flavoring. In Madagascar the roots are eaten. A few species have conspicuous purplish flowers and variegated foliage, and find a place in cultivation among ornamental plants; but these are exceptions, and although the genus is closely allied to *coleus*, well known for its rich foliage, the species are usually recommended by their odor

and not by their appearance. All the species are easily cultivated from seed, and most of them are half hardy in the latitude of Boston.

Sweet Basil (Ocymum basilicum).

BASIL, a Bulgarian monk and physician, founder of a religious sect called Bogomiles (Slavic *Bog*, God, and *milui*, have mercy), burnt alive in Constantinople in 1118. His followers believed that before the birth of Christ God had a son Satanael, who revolted, seduced the angels, created the visible universe, and gave the Mosaic law, and that Christ had the mission to destroy the power of Satanael by consigning him to hell under the name of Satan. Basil repudiated marriage, favoring a free intercourse of the sexes, rejected the doctrine of the resurrection, the books of Moses, and the eucharist, abolished baptism, characterized churches as devilish, denounced priests and monks, and would not recognize any liturgy but the Lord's prayer. He condemned all cruelty to animals, and objected to the eating of meat and eggs. In 1111 the emperor Alexis Comnenus convened a synod for the condemnation of the Bogomiles; and entrapping Basil, as their chief leader, into making a confession of his faith, he convened a second synod (1118), calling upon him to retract; but he remained firm, expecting, even while the flames surrounded him, that angels would come to his rescue. See Engelhardt, *Kirchengeschichtliche Abhandlungen* (Erlangen, 1832).

BASIL I., or **Basilius,** surnamed the Macedonian, emperor of the East, born in the province of Macedon about 825, died March 1, 886. At a very early age he was taken prisoner by a party of Bulgarians, who carried him into their country and sold him as a slave. Having obtained his liberty, he proceeded to Constantinople, where a monk caused him to be presented to Theophilus the Little, a relative of the emperor. Accompanying his master to Greece, he won the favor of a rich widow, who made him her heir, and whose wealth enabled him to purchase large estates in his native country. He continued in the service of Theophilus till 842, when he brought himself to the notice of the emperor Michael III. by vanquishing in single combat a gigantic Bulgarian. He gradually rose to the dignity of chief chamberlain, and repudiated his wife in order to marry one of the emperor's concubines. He formed a conspiracy against Bardas, on whom the dignity of Cæsar had been conferred, caused him to be assassinated in the presence of Michael, and soon afterward was created Augustus and recognized as heir apparent. Henceforward, in consequence of the inebriety and incapacity of Michael, the whole administration of the government devolved upon him. The emperor, perceiving himself reduced to a cipher, became jealous and resolved on Basil's ruin; but the plot was revealed to Basil, and on Sept. 24, 867, Michael III. was murdered. Basil was now proclaimed emperor, and during a reign of over 18 years displayed a vigor and ability which few of his predecessors had equalled. He removed the patriarch Photius from the see of Constantinople, because of the religious feuds which he had excited there, and installed Ignatius in his place; reduced the revolted Paulicians to obedience; compelled the Arabs to raise the siege of Ragusa in 872, vanquished them in Syria and Mesopotamia in several engagements, and attempted to drive them out of Italy. His general Procopius was defeated and slain through the treachery of his lieutenant Leo, whom Basil accordingly caused to be mutilated and sent into exile. Basil meanwhile became jealous of his own son Leo, owing to the slanders of a courtier; but, convinced at the last moment of the young man's innocence, he restored him to his affections, and punished his calumniator. The emperor died in consequence of a wound received from a stag. He made a collection of some of the laws of the eastern empire, which was entitled the "Basilican Constitutions," and wrote a small work on the moral, religious, social, and political duties of sovereigns, which he dedicated to his son and successor Leo the Philosopher. This work is still extant; the best edition of it is that published in Göttingen, 1674.—**Basil II.,** emperor of the East, eldest son of Romanus II., born in 958, died in 1025. Romanus had decreed that his infant sons Basil and Constantine should reign together under the guardianship of their mother. Immediately after the death of Romanus, however, their mother married Nicephorus Phocas, and raised him to the throne; and the brothers did not succeed to their inheritance till 976. Constantine gave himself up to licentiousness, and the whole administration of the government devolved on Basil. His reign was a series of domestic and foreign wars. He put down the formidable revolt of Sclerus, defeated the attempt of Otho II., emperor of Germany, to enforce his claim to Calabria and Apulia in Italy, in right of his wife Theophania, the sister of

Basil; and was repeatedly engaged in war with the caliph of Bagdad, from whom he made valuable conquests, and with his old allies the Sicilian Arabs. But his most important war was that which resulted in the conquest of Bulgaria. This war broke out in 987, and lasted, with few intermissions, till 1018. In the first years of it Basil conquered a considerable portion of the southwestern division of that kingdom; but in 996 Samuel, its king, overran all Macedonia and Thessaly, laid siege to Thessalonica, and penetrated into the Peloponnesus. During his homeward march, however, he was encountered by Basil on the banks of the Sperchius, and defeated. In 999 Nicephorus Xiphias, the general of Basil, captured two of the most important strongholds in Bulgaria proper; and in 1002 Samuel again invaded Macedonia and Thrace, and even took Adrianople, but was driven back to his own kingdom. Basil gave his enemies such an overthrow at Zetunium that they never recovered from the blow. On this occasion the emperor showed no mercy to the vanquished. Of 15,000 prisoners he ordered the eyes of all to be put out save those of one in every 100, who was to guide his 99 unfortunate brethren in arms to their native land. The cries of these poor wretches, as they approached the camp of their countrymen, had an effect on the Bulgarian monarch which the shouts of his foes could never produce; he fell to the ground insensible, and expired on the third day after. The conquest of Bulgaria was, however, not entirely completed till 1018, when it became a Greek province and was subjected to the rule of a Greek governor. Basil contemplated the expulsion of the Arabs from Sicily; but in the midst of his preparations for it he was seized with an illness which terminated his life. To expiate the sins of his youth, Basil wore the hair shirt of a monk beneath his imperial robe, and lived the abstemious life of an ascetic. Notwithstanding his incessant wars, he accumulated from his surplus revenue during his reign an enormous fortune, estimated to have been equal to £8,000,000 sterling.

BASIL THE GREAT, a saint of the Christian church, born at Cæsarea in Cappadocia in 328 or 329, died Jan. 1, 379. His father and mother were St. Basil the Elder and St. Emmelia. His father belonged to a noble family of Pontus, which had long been Christian. He had nine brothers and sisters, all of whom, according to the testimony of their intimate friend St. Gregory Nazianzen, were remarkable for sanctity, and three of whom are canonized, viz., St. Gregory Nyssen, St. Peter of Sebaste, and St. Macrina. His early education was superintended by his father, after whose death he continued his studies at Cæsarea, Constantinople, and Athens. He excelled in eloquence and logic, applied himself also to philosophy, natural science, medicine, poetry, and the fine arts, and was one of the most ardent advocates of the study of classical literature and eloquence in Christian schools. At Athens he formed an intimacy with St. Gregory Nazianzen. He returned to Cæsarea in 355, and opened a school of rhetoric with brilliant success, but soon gave it up for the purpose of embracing a religious life. Dividing the principal part of his property among the poor, he travelled through Syria, Mesopotamia, and Egypt, to visit the most celebrated anchorets and monasteries. In 358 he returned home, was ordained lector by Dianius, and retired to his grandmother's house in Pontus. His mother and sister had already founded a female convent in the neighborhood, on the bank of the river Isis, in which his sister was superior. Basil now founded a monastery, according to some authorities on the opposite bank, according to others at Seleucobol, and in the course of time other affiliated monasteries. He remained in his own convent as superior for four years, when he yielded his place to his brother St. Peter of Sebaste. After his election to the episcopate he continued to watch over these religious homes, and composed rules and spiritual treatises for them; and the principal part of the religious in the East are hence called Basilians. In 359, during a famine, he sold the remaining portion of his property for the relief of the sufferers. Gregory joined him, and has left an interesting account of the life they led in common, in a little hut with a barren garden spot around it, where they found exercise and diversion in cutting stone, carrying wood, planting flowers, and making canals to irrigate the sandy soil. In 362 Basil went back to Cæsarea and took with him a number of his religious brethren, it seems, to found a cloister. Julian the Apostate was now emperor; he had been Basil's fellow student at Athens, and he sent a hypocritical invitation to him to come to his court. This invitation was declined, and was followed by another, which was accompanied by an order to pay 1,000 pounds of gold to the treasurer or be dragged through the city. Basil replied in a very bold and severe style to his old comrade, who soon afterward found his death in the Persian war. In his 35th year Basil was ordained priest by Eusebius, the successor of Dianius in Cæsarea, but for some reason was soon dismissed from the high post which the bishop had assigned him. Eusebius's conduct met with general censure. Basil retired again to Pontus, but in 366 Eusebius was obliged to recall him to Cæsarea, to stem the irruptions which Arianism was making under the auspices of the emperor Valens. In 370, on the death of Eusebius, he was elected archbishop of Cæsarea. During the remaining nine years of his life he presided over this important see in such a manner as to win the reputation of one of the greatest bishops of the church. The whole city followed him to the grave, Jews and heathen wept with the Christians at his death, and St. Gregory Nazianzen pronounced his panegyric. The principal efforts of St. Basil the Great were directed to the defence of the

divinity of Jesus Christ against the Arians. On account of this he is styled by the general council of Chalcedon "the great Basil, the servant of grace, who has proclaimed the truth to the whole earth." He is held in especial veneration in the Greek church, though he was a strenuous supporter of the Nicene creed. His works were first published at Basel with a preface by Erasmus in 1532. The most complete edition is that of Garnier (3 vols., Paris, 1721–'30; reprinted in Paris in 6 vols. 8vo, 1839).

BASILAN, an island of the Malay archipelago, the largest of the Sooloo group, separated by the strait of Basilan, 12 m. wide, from the S. W. extremity of the island of Mindanao; area, about 500 sq. m.; pop. about 5,000. The coast abounds with fish; there are wild hogs, deer, and elephants in the forests. It is a favorite resort of pirates.

BASILIAN MONKS, or Monks of St. Basil, a religious order founded by St. Basil the Great, about the middle of the 4th century. When the saint retired into the deserts of Pontus he found there a vast number of solitaries whose manner of life he strove to copy. Crowds of followers gathered around him, and so rapidly did their number increase that he found it necessary to build a large monastery, and to embody in a code of written laws instructions for their conduct. These rules were published in 362, and received the sanction of Pope Liberius. The new order spread rapidly throughout the East, and it is said that before his death Basil saw himself the spiritual father of over 90,000 monks. In the 8th century they were treated with great severity by the emperor Constantine Copronymus, a violent iconoclast. The Basilian rule was translated into Latin by Rufinus, and thereupon passed into the West, where it became the basis of all monastic institutions up to the time of St. Benedict. Great numbers embraced it in Italy, Sicily, and Spain; but, though calling themselves by the common name of "monks of St. Basil," these various communities were independent of each other until Pope Gregory XIII. united them under one head, and at the same time corrected several abuses which had crept in among them during the lapse of years. Various causes have since led to their decline in the West, but the order is still large and important. Their principal monastery is that of St. Saviour at Messina. In Spain, where they are very numerous, the Latin rite is universally followed; in Italy and Sicily they generally conform to the ritual of the Greek church, with a few modifications. Most of the monks of the Greek church in Russia claim to belong to the order of St. Basil, but if so they have deviated widely from their original rule. The historians of the order state that it has produced 14 popes, numerous patriarchs, cardinals, and archbishops, 1,800 bishops, and 11,800 martyrs.

BASILICA (Gr. *βασιλική*, from *βασιλεύς*, king), a term first applied in Athens to buildings in which public business was transacted, and afterward in Rome to stately edifices of an oblong shape, with four corners, adorned with Corinthian columns, generally used for the administration of justice, and for other public purposes. The first basilica at Rome was built by Cato the Elder, and was called *Porcia*. The *basilica Julia*, built by Vitruvius at Fanum for Julius Cæsar, was supported by 100 marble pillars, embellished with gold and precious stones, and contained 13 judgment seats for the prætors. There were about 20 basilicas in Rome, and one in every provincial town. The only one of which considerable remains still exist is that of Trajan. Among the most celebrated basilicas were those at Palestrina, Pompeii, and Pæstum. Many of them became churches, some of which in the 4th and 5th centuries were called basilicas; and the term was also given to the tomb of Edward the Confessor and other mediæval church-like sepulchral monuments. There are several churches in Rome called basilicas, but the name is chiefly applied in modern times to the five patriarchal churches of St. Peter, St. John Lateran, Santa Maria Maggiore, St. Paul, and St. Lorenzo, the last two being without the walls. Of the smaller basilicas the most important are those of Santa Croce, St. Sebastian, St. Agnes, and San Pietro in Vincoli.—See Bunsen, *Die christlichen Basiliken Roms* (Munich, 1843), and Hübsch, *Der altchristliche Kirchenbau* (Carlsruhe, 1862).

BASILICATA, a province of S. Italy, situated chiefly E. of the main Apennine ridge, and between it and the gulf of Taranto, occupying the greater part of ancient Lucania; area, 4,122 sq. m.; pop. in 1871, 509,089. The chief rivers, the Sinno, Agri, Basento, and Bradano, form extended valleys bounded by offsets from the Apennines, which latter slope gradually toward the sea and settle into low plains within 10 m. of the coast. These plains, famous in antiquity as the plains of Metapontum and Heraclea, are still remarkable for their fertility. The interior is mountainous, rugged, and little visited, and the inhabitants retain primitive modes of life. The principal tree is the pine. The most extensive forests are along the Sinno. In the most northern part of the province, watered by the Ofanto, is the volcanic region of Mount Vultur, which extends N. and S. between 15 and 20 m., and is 20 m. wide. The mountain proper is situated between Melfi and Rionero, and is 3,000 ft. high. Disastrous earthquakes occurred here in 1851 and in December, 1857. Basilicata is rich in cattle, silk, wine, and saffron. Cotton and olive oil are produced moderately. The chief cereals are maize and buckwheat. It is divided into the districts of Lagonegro, Melfi, Matera, and Potenza. Capital, Potenza.

BASILIDES, the founder of a Gnostic sect, who taught in Alexandria about the year 120. Some say that he was born in Egypt, others in Syria or Persia. He taught that the Supreme Being produced from himself seven other

beings, called æons. These are, Intelligence (Νοῦς), Reason (Λογός), Providence, Wisdom, Power, Peace, and Holiness; these seven, with the Supreme Being himself, constituting the perfect eight (Ὀγδοάς). The æons Wisdom and Power produced the angels of the first order, who produced those of the second order, and so on to the number of 365 orders, each order dwelling in its own heaven. From Greek letters the numerical value of which is 365 was formed the mystical word *Abraxas*, which became the symbol of the sect founded by Basilides. The seven angels of the lowest order, whose archon or chief was the God of the Hebrews, were the creators of the world. All human souls had committed sins in a previous state of existence, and were consequently excluded from the realm of light. To effect their return to this realm, the Nous united himself with the man Christ Jesus at the time of his baptism; but the sufferings which Jesus endured were borne by the man only, and were in expiation, as all suffering is, of sins committed by him in a former state of existence. Basilides forbade marriage and the eating of meat. He wrote a book entitled *Exegetica*, fragments of which are still extant, and several other works, among which is a gospel. His followers, the Basilidians, existed as late as the 4th century; but they soon degenerated from the doctrines of their founder, affirming the God of the Hebrews to be the enemy of the world of light, and became grossly immoral.

BASILISCUS, emperor of the East, died in Cappadocia in 477. Though his early exploits against the Scythians had been far from brilliant, he was through the influence of his sister, the empress Verina, wife of Leo I., placed in command in 468 of the fleet which sailed from Constantinople to Carthage against Genseric, consisting of over 1,100 ships and 100,000 men. The expedition safely reached the coast of Africa, but ended disastrously. Basiliscus, after displaying either the greatest pusillanimity or treachery, fled to Constantinople at the beginning of the contest, and hid himself in St. Sophia until his sister had appeased the wrath of the emperor. He was punished merely with banishment to Thrace. After the death of Leo I. (474) the throne devolved on his infant grandson, Leo II., the son of his daughter Ariadne and of her Isaurian consort Zeno. The latter, hoping to become sole ruler after the suspiciously sudden death of his son, was deposed by Verina and Basiliscus, and Basiliscus was proclaimed emperor by the senate. During his brief administration Constantinople was partly laid in ashes (476), the famous public library with over 120,000 MS. volumes, including the 48 books of the Iliad and the Odyssey, executed in golden letters, being burned. He burdened the people with taxes, and his rule became so intolerable that Zeno was recalled and Basiliscus and his wife and children were imprisoned in a tower in Cappadocia, where they were left to die of cold and starvation.

BASILISK (*basiliscus*, Laurenti), a genus of saurian reptiles of the family of *iguanidæ*, inhabiting the northern parts of South America, the West Indies, and Central America. The genus is characterized by a thin triangular fold of skin rising vertically from the occiput and inclined backward, resembling in shape a Phrygian cap; the external edge of the posterior toes is bordered with a scaly serrated fringe; the back and tail are surmounted in the adult male by an elevated crest, supported on the spinous process of the vertebræ, of varying height, and serrated; in one species this crest resembles the dorsal fin of a fish, while in the other it is merely a serrated scaly ridge; between the dorsal and caudal portions the crest is interrupted, and both are covered with thin scales disposed in series parallel to the spinous processes. Under the neck is a rudimentary angular crest, behind which is a well marked transverse fold. There are 5 or 6 teeth on each palatal bone, and 50 to 60 in each jaw, pointed and subconical, or compressed. It is distinguished from the iguana by the absence

Basiliscus mitratus.

of femoral pores. The head is covered with small many-sided ridged scales; the body above has rhomboidal ridged scales, arranged in transverse bands; the ventral scales are either smooth or ridged, according to the species. The limbs, especially the posterior, are very long, as are also the toes, which are slender and armed with nails; the body is nearly cylindrical, and the tail compressed and three times as long as the trunk. Two species are described. 1. The hooded basilisk (*B. mitratus*, Daudin) has the above-mentioned cap and dorsal crest, and the ventral scales smooth, without transverse black bands on the back; the color above is yellowish brown, beneath whitish; the sides of the neck are leaden brown, and the throat is marked by longitudinal bands of the same color; sometimes there is a white band bordered with black on the sides of the neck and back; the length varies from 24 to 30 inches, of which the tail measures about two thirds. 2. The banded basilisk (*B. vittatus*, Wiegmann) differs from the preceding in having only a slight serrated crest along the back and tail, the ventral scales

ridged, and black bands across the back; the general color is the same, with the exception of dark brown spots on the head, chest, and limbs, and 6 or 7 black bands extending across the back to the ventral surface. This species was considered by Kaup as belonging to a different genus, which he called *corythæolus;* it formed the genus *œdicoryphus* of Wagler. Notwithstanding its forbidding appearance, the basilisk is a perfectly harmless animal; it feeds on insects, and lives principally on trees, which it climbs with great dexterity; it is supposed that the dorsal crest may serve to steady its motions as it springs from tree to tree.—The ancient poets imagined an animal, which they called basilisk, whose breath poisoned the air, whose glance was death, and whose presence was fatal to all other creatures, including man; they supposed it to have the form of a snake, and to be produced from the egg of a cock brooded upon by a serpent. The *tziphoni* of the Hebrew Bible is a true snake, improperly called basilisk in the Greek version, and in the English translation cockatrice, an animal as fabulous as the ancient basilisk.

BASILOSAURUS. See ZEUGLODON.

BASKERVILLE, John, an English printer and type founder, born in 1706, died in Birmingham, Jan. 8, 1775. Previous to becoming a type founder he was a writing master, a tombstone cutter, and a successful japanner. He greatly improved type founding and the quality of printing ink. His printing has a rich purple-black hue, supposed to be made by subjecting each sheet as it came from the press to pressure between heated copper plates. He retired in 1765, but his press continued to be highly esteemed in Birmingham until the Priestley riots of 1791, when the mob destroyed the printing office. His remains were removed in 1821 to Christ church.

BASKET, a vessel made by interweaving twigs or reeds, grasses, leaves, metal or glass wire, whalebone, or any similar material. Baskets differ greatly in their forms, sizes, and the uses to which they are applied, from the rudest utensils of necessity to the most delicately wrought articles of luxury and taste. A breastwork on the parapet of a trench is sometimes formed of what is called baskets of earth (corbeils), which are so placed as to allow the soldiers to fire between them, sheltered from the fire of the enemy.—Basket making is one of the simplest and most ancient of the arts. The Romans found wicker boats covered with skins in use among the ancient natives of Britain. Round boats of wickerwork covered with bitumen or skins were used on the Tigris and Euphrates in the times of Herodotus; and similar boats, about 7 ft. in diameter, are still used there. In India boats of a similar form and construction are still in use in crossing the less rapid rivers; they are made of bamboo and skins, requiring only a few hours' labor; they are about 12 ft. in diameter and 4 deep, are navigated with oars or poles, or towed by oxen or men, and are sometimes used to transport large armies and heavy artillery. The ancient Britons manufactured wicker vessels with extraordinary skill and ingenuity; their costly and elegant baskets are mentioned by Juvenal in speaking of the extravagance of the Romans in his time. The natives of South America make baskets of rushes so closely woven as to hold liquids; their manufacture and sale throughout the Spanish countries is very extensive. The natives of Tasmania wove similar water-tight vessels of leaves. The Caffres and Hottentots possess equal skill in weaving the roots of certain plants. Shields in ancient times were constructed of wickerwork, plain or covered with hides; they are still thus made among savage tribes. Wickerwork is now largely used for the bodies of light carriages. On the continent of Europe Holstein wagons, carriages drawn by two horses and carrying several persons, are made almost entirely of wickerwork. In different parts of the world, houses, huts, gates, fences, sledges, and shoes, and other articles of use and ornament, are formed by this ancient and universal art.—In making baskets, the twigs or rods, being assorted according to their size and use, and being left considerably longer than the work to be woven, are arranged on the floor in pairs parallel to each other and at small intervals apart, and in the direction of the longer diameter of the basket. Then two large rods are laid across the parallel ones, with their thick ends toward the workman, who is to put his foot on them, thereby holding them firm, and weave them one at a time alternately over and under those first laid down, confining them in their places. This forms the foundation of the basket, and is technically called the slat or slate. Then the long end of one of these two rods is woven over and under the pairs of short ends, all around the bottom, till the whole is woven in. The same is done with the other rod, and then additional long ones are woven in, till the bottom of the basket is of sufficient size. The sides are formed by sharpening the large ends of enough stout rods to form the ribs, and plaiting or forcing the sharpened ends into the bottom of the basket, from the circumference toward the centre; then raising the rods in the direction the sides of the basket are to have, and weaving other rods between them till the basket is of the required depth. The brim is formed by bending down and fastening the perpendicular sides of the ribs, whereby the whole is firmly and compactly united. A handle is fitted to the basket by forcing two or three sharpened rods of the right length down the weaving of the sides, close to each other, and pinning them fast about two inches below the brim, so that the handle may retain its position when completed. The ends of the rods are then bound or plaited in any way the workman chooses. This is a basket of the rudest kind. Others will vary according to the

artist's purpose, skill, and materials. When whole rods or twigs are not adapted to the kind of work required, they are divided into splits and skeins. Splits are made by cleaving the rod lengthwise into four parts, by means of an implement consisting of two blades, crossing each other at right angles, the intersection of which passes down the pith of the rod. These splits are next drawn through an implement resembling a common spoke-shave, keeping the pith presented to the edge of the iron, and the back of the split against the wood of the implement. The split is then passed through another implement, called an upright, to bring it to a more uniform shape. This consists of a flat piece of steel, each end of which has a cutting edge, like that of an ordinary chisel; this piece is bent round, and the edges are made to approach each other as near as desired by means of screws, the whole being fixed into a handle. By passing the splits between these two edges, they are reduced to any required thickness. The implements required in basket making are few and simple, consisting, besides those just mentioned, of knives, bodkins, and drills for boring, leads for steadying the work while in progress, and when it is of small dimensions, and a piece of iron called a beater.—The splints of various kinds of wood, particularly certain species of ash, elm, and birch, are extensively employed in basket work. These splints are obtained by beating logs of the wood with a maul, thus loosening and separating the different layers or rings into narrow strips. This is the simple and primitive process, and is necessarily slow, and restricted to woods of a free texture. Several machines have been invented and are now employed for the manufacture of splints, by which different kinds of wood, prepared by steaming or otherwise, are cut or rived into the required form. Basket willow and osier are terms commonly applied to the species of *salix* most used in basket work. (See Osier.)

BASNAGE DE BEAUVAL, Jacques, a French author and diplomatist, born in Rouen in 1653, died at the Hague in 1722 or 1723. He received an excellent theological and classical education, was Protestant minister at Rouen from 1676 to 1685, and on the suppression of the Reformed church in that city was pensioned and permitted to go to Rotterdam, where he had charge of the Walloon church till 1709. He afterward presided over the same denomination at the Hague at the request of Heinsius, whose influence also led to his being employed diplomatically. In 1717 he coöperated with the abbé Dubois in concluding a defensive alliance between the states general and France and Great Britain, after which his confiscated Rouen estates were restored to him. He was the author of various theological and other works, the best of which is his *Histoire des Juifs, depuis Jésus-Christ jusqu'au présent, pour servir de supplément à l'Histoire de Josèphe* (5 vols., Rotterdam, 1706; new ed., Paris, 1710).

BASQUE PROVINCES. See Basques.

BASQUES, a peculiar race, who from time immemorial have inhabited both slopes of the Pyrenees. They number about 800,000, of whom about 150,000 are in the French department of Basses-Pyrénées, the remainder in the Spanish provinces of Navarre, Biscay, Guipuzcoa, and Alava. The last three provinces are usually styled the Basque provinces. From the remotest times the Basques have remained unsubdued in their mountain homes, and neither Carthaginian, Roman, Gothic, Saracen, French, nor Spanish domination has been able to efface their distinctive characteristics. They are of middle size, compactly built, robust and agile, of a darker complexion than the Spaniards, with gray eyes and black hair. They are simple, but proud, impetuous, merry, and hospitable. The women are beautiful, skilful in performing men's work, and remarkable for

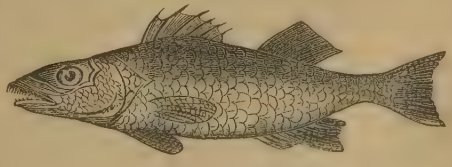
Basques.

their vivacity and grace. The Basques are much attached to dancing, and are very fond of the music of the bagpipe. The national dress is a red jacket, long breeches, a red or brown sash, a square-knotted neck tie, hempen shoes, and pointed caps. The women wear headdresses of gay colors over their variously braided and twisted hair. In the social relations of the Basques patriarchal manners and habits prevail. The art of agriculture is but little advanced, yet the fertility of the soil and the industry of the occupants produce an abundance. Among the Spanish Basques there is an almost universal equality of conditions, the nobility being few in number. There are few cities or villages, but small houses lie scattered upon nearly all the heights. In their political constitution, they are divided into districts, each of which chooses annually an alcalde, who is both a civil and military officer, and a member of the supreme junta, which meets every

year for deliberation upon matters of general interest. Their rights are protected by the *fueros*, or written constitutions, which were granted by ancient Spanish kings. In religion they are Roman Catholics.—Whatever may have been the origin and ethnological relations of the Basque people, they have enjoyed an immemorial reputation for valor in their present seats. They were the Cantabri of the Romans, and are alluded to by Horace as a people hard to be taught to bear the yoke. The Spanish Basques long maintained themselves independent, though situated between the rival monarchies of Navarre and Castile; and though in the 13th century they were incorporated into the Castilian monarchy, they retained their old liberties, paid no taxes, and enjoyed throughout Spain all the exemptions of the nobility. The Spanish constitution of 1812 stripped them of their long-possessed privileges, which however they recovered in 1823, after an energetic insurrection. When, after the death of Ferdinand VII. in 1833, Isabella determined to take their privileges from them again, they embraced with ardor the cause of Don Carlos, and after six years of rebellion recognized the young queen only when the reëstablishment of the *fueros* was promised them.—The proper name of the Basque language is *Euscara* or *Esquera*, which degenerated into *Vasc*, *Bascongada*, and in the French provinces into *Bascuence*. *Eusk* or *Esc* probably signifies sunrise or east, pointing to the original country of the Basques. The people call themselves *Euscaldunac*, people of the language, designating all strangers as *Erdaldunac*, people of foreign language. Some natives derive the name of Bascon from *basocoa*, forest-dweller. There are three principal dialects of this language: the Guipuzcoan, the purest, pleasantest, and most developed of all, spoken in Guipuzcoa and Alava; the Vizcayan; and the Labortan of Lower Navarre, Labourd, and Zuberoa, which is softer than the Vizcayan. Great diversity of opinion exists among writers on everything concerning not only the history but the language of this brave, hardy, industrious, freedom-loving people. It is, however, certain that the Euscara entirely differs from the languages of the Indo-European family. It has some common traits with the Magyar, Osmanli, and other dialects of the Uralo-Altaic family. This similarity consists in blending several words into one, especially in the conjugation of verbs, and in the exclusion of combinations like *cr*, *gr*, *pr*, *pl*, *tr*, &c. But there are few coincidences of the roots of words. The Euscara is the primitive language of the inhabitants of Spain, who were called Iberi by the classic writers, were settled in the whole peninsula, in a part of Aquitania, partly in Sicily, Sardinia, and Corsica, and traces of whom are found in Italy and in Thrace. By an invasion of a branch of Celts, in prehistoric times, these aborigines were mixed in a part of the peninsula with the invaders, thus producing the Celtiberi, who included the Cantabri. Many writers confound the latter with the aboriginal Basques; but the inhabitants of Iberia at the time of the Roman invasion were of three sorts: the Iberi, the Celtici, and the Celtiberi, to whom the Cantabri belonged. The settlements of Phœnicians, Greeks, and Carthaginians on the coasts of the Mediterranean sea are of much later date. The Euscara has no words beginning with *r*, *f*, *st;* it has more sibilants than the Greek, viz., *s*, *z*, hard and soft *ts;* it is very rich in words and grammatic forms; it is full and well-sounding, and very perspicuous. Its predominant combinations of sounds are: *ar*, man; *bae*, *be*, low, deep; *cal*, damage; *car*, *gar*, high; *maen*, *men*, power; *na*, plain, high; *O*, high; *se*, *ce*, plain, &c. Very rare combinations are *ner*, and *tar*, *ter*. We possess the most valuable grammatical information in the Vizcayan, the best lexical development in the Guipuzcoan (Larramendi's *Diccionario trilingüe, Castellano, Bascuence, y Latin*, San Sebastian, 1853), but scarcely anything available in the Labortan dialect.—William von Humboldt (in Adelung's *Mithridates*, and in his work on the aborigines of Spain, &c., Berlin, 1821), Prince Louis Lucien Bonaparte, and Chaho (*Dictionnaire basque*, Paris, 1857 *et seq.*) furnish the best materials among all foreign writers on the Basque language. See also Ticknor's "Spanish Literature," vol. iii., and *Le pays basque, sa population, sa langue, ses mœurs, sa littérature et sa musique*, by Francisque Michel (Paris, 1857), who has also published a *Romancéro du pays basque* (Paris, 1859).

BAS-RHIN, a former department of France, now included in the German imperial territory of Alsace-Lorraine. (See ALSACE-LORRAINE.)

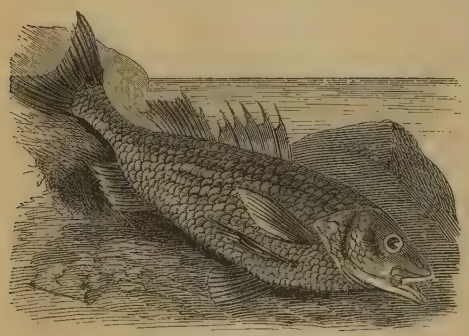
BASS (*labrax*), a family of sea and fresh-water fishes of which there are many well known varieties in American waters. They belong to the division *acanthopterygii*, or those having spinous fins, to the family of the *percidæ*, or those of the perch type, and have several subgenera, as *grystes* and *centrarchus*, which are the most remarkable. Bass of various kinds are found in most of the waters of the world, and are everywhere well esteemed, both as a table fish and by the angler. The principal European variety is the *labrax lupus*, which



European Bass (Labrax lupus).

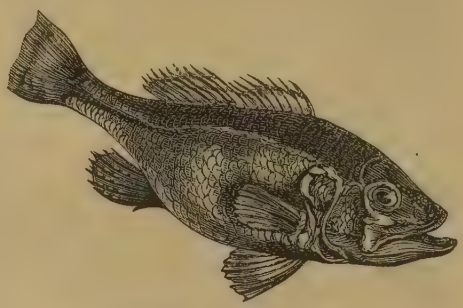
has by some writers been confounded with our striped bass, an entirely different fish, first distinguished by Dr. Samuel L. Mitchill of New York. The following are the American varie-

ties: 1. The sea bass, sometimes called blue or black bass (*centropristis nigricans*). This is purely a sea species, never coming into fresh water. Its general color is blue-black, slightly bronzed. The edges of all the scales are of a darker color than the ground, which gives it the appearance of being covered by a black network. The fins, except the pectoral, are pale blue, the anal and dorsal spotted with a darker shade of the same color. The teeth are set, like those of a carding machine, over all the bones of the mouth, those on the lips the largest. The dorsal fin has 10 spines, 11 soft rays; the pectorals, 18 soft rays; the ventrals, 1 spine, 5 soft rays; the anal, 3 spines, 7 soft rays; the caudal is trilobed and has 18 soft rays. The weight of the sea bass varies from ½ lb. to 17 lbs., the latter very rare. 2. The striped bass (*L. lineatus*). This is the rock fish of the Delaware and Potomac. Its color is bluish brown above, silvery white below, with from 7 to 9 equidistant, dark, parallel stripes of chocolate brown, those above the lateral line terminating at the base of the caudal fin, those below it fading away above the anal fin. The teeth are numerous on the palatal and maxillary bones, and on the tongue. The 1st dorsal fin has 9 spines; the 2d, 1 spine, 12 soft rays; the pectorals, 16 soft rays; the ventrals, 1 spine, 5 soft rays; the anal, 3 spines, 11 soft rays; the caudal, which is deeply lunated, has 17 soft rays. This fish winters in the deep, warm, muddy sea bays, and runs up the rivers in the spring in pursuit of the smelt, and to devour the shad roe, and in the autumn to spawn. It runs from the size of a smelt up to 50, 60, and 70 lbs. weight. It is very voracious,



Striped Bass (Labrax lineatus).

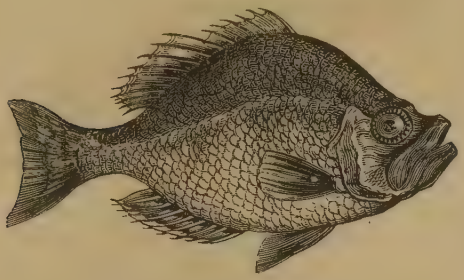
excellent on the table, and an especial favorite of the angler. 3. The bar fish (*L. notatus*), a variety of the fish above described, distinguished from it by Lieut. Col. Smith of the British army. The principal distinction is that the lines on the sides are not continuous, but are broken into spots. 4. The ruddy bass (*L. rufus*). 5. The little white bass (*L. pallidus*). These are two small and insignificant varieties, not exceeding a few inches in length, known to anglers in the vicinity of New York, where they abound, at about the meeting of the fresh water and the tide, as the river perch and the white perch.—We now come to the purely fresh-water species, which are as follows: 6. The black bass of the lakes (*grystes nigricans*).



Black Bass (Grystes nigricans).

Its color is blue-back, glossed with bronze, and marked with darker clouded bandings; belly lighter colored. Both jaws are armed with a broad patch of small, sharp, recurved teeth; the vomer has also a patch, and the palatal bones a belt or band of teeth of the same description. The dorsal fin has 9 spines; the 2d dorsal, 1 spine, 14 soft rays; the pectorals, 18 soft rays; the ventrals, 1 spine, 12 soft rays; the caudal, 16 soft rays. It is found everywhere west, from the basin of the St. Lawrence to the tributaries of the Ohio, and has lately been extensively introduced into the waters of New York and New England. It runs from a few inches in length to rarely 8 lbs. weight. It is a bold biter and an excellent fish. 7. The Oswego bass (*G. megastoma*) is often confounded with the species last described, but is entirely distinct. Its principal feature is the great size of its mouth. It is a thicker fish, and its head is larger as compared to its size. Color, dark greenish blue, lighter on the belly. The dorsal fin has 9 spines, 14 soft rays; the pectorals, 13 soft rays; ventrals, 1 spine, 5 soft rays; anal, 3 spines, 11 soft rays; caudal, 20 soft rays. It abounds in the bays and river mouths of Lake Erie, bites well at live or dead minnow, and is a good fish, but inferior to the last described variety. 8. White bass (*multilineatus*), sometimes called white perch, peculiar to Lake Erie and the upper lakes, and very abundant in them. In color it is light olive above and silvery white on the sides and belly, with numerous longitudinal dark lines, the numbers varying in different specimens. This fish has not been scientifically described, so that its dental system and that of its fin rays cannot be given with accuracy. It is said to be an excellent fish on the table, and a bold, voracious biter. 9. The grass bass (*centrarchus hexacanthus*), sometimes called the roach, also peculiar to Lake Erie, where it is abundant in the small bays and at the river mouths. In color it is spotted or marbled above, with dark shades on a sea-green ground,

and on the sides with the same marks on light green or yellow. The sides of the head and body are of an iridescent white, the belly silvery white. Like the preceding fish, it has not been scientifically distinguished or described. Its anal fin is said to be extremely long, and its abdomen consequently very small. Wherever the large-mouthed bass is found this fish is



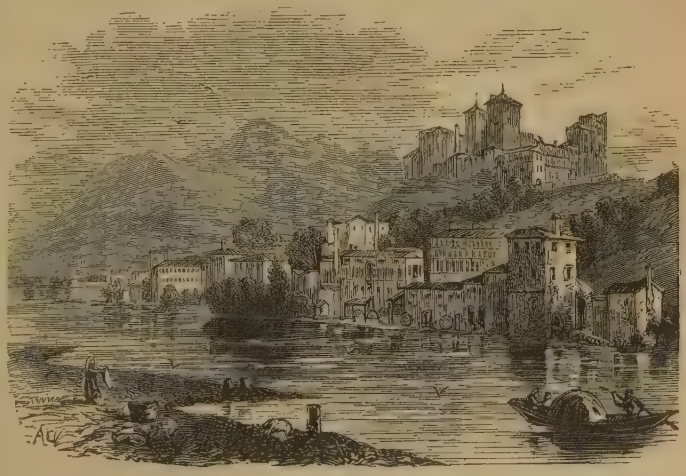
Rock Bass (Centarchus aëneus).

plentiful. It rarely exceeds 10 inches in length and 2 lbs. in weight. 10. The rock bass (*C. aëneus*). Its color is dark coppery yellow, banded with irregular darker clouds and green reflections; fins bluish green; teeth small, recurved, on the maxillaries, vomer, palatals, and pharyngeals. The dorsal fin has 11 spines, 12 soft rays; the pectorals, 14 soft rays; the ventrals, 1 spine, 5 soft rays; the anal, 6 spines, 11 soft rays; the caudal, 17 rays. This fish, originally peculiar to the basin of the St. Lawrence, has come down the Erie canal and become common in the Hudson river, where it is freely taken. It rarely exceeds a pound in weight, but is an excellent fish on the table, and affords admirable sport to the angler. 11. The growler (*grystes salmonoeides*), generally called the white salmon in the southern states, closely resembles the black bass in form, but grows larger. It is of a deep bluish green above, lighter below; when young has 25 or 30 longitudinal dark bands, which grow paler by age. The dorsal fin has 10 spines, 14 soft rays; the pectorals, 16 soft rays; the ventrals, 1 spine, 5 soft rays; the anal, 3 spines, 12 soft rays; the caudal, 17 soft rays. This also is said to be a bold biter and a good fish. With this species ends, so far as is yet ascertained, the list of the bass family proper to American waters, although it is probable that in the course of time future varieties may be discovered in the vast network of lakes and rivers which have not yet been scientifically explored through one fourth of their extent.

BASS, or **Basswood.** See LINDEN.

BASS, George A., an English navigator, died early in the 19th century. He was a surgeon in the navy, and made in 1796 with Matthew Flinders his first two voyages of discovery on the coast of New South Wales in a boat only 8 ft. long, which they called the Tom Thumb. In 1797 the government despatched him on a third voyage, during which he discovered in 1798 the strait that bears his name, between Tasmania and New South Wales. He was soon after sent again, with Flinders, with directions to sail around Tasmania and examine and project the coast. His labors greatly increased the progress of colonization, but he died unhonored and unrequited for his arduous and adventurous efforts. See "Voyage to Terra Australis" (2 vols., London, 1814), by Flinders.

BASSANO, a town of Italy, province of Piacenza, on the left bank of the Brenta, 31 m. N. by W. of Padua and 15 N. E. of Vicenza; pop. about 13,000. The fine bridge over the Brenta built by Palladio was swept away in 1748, and restored by Ferracino. The old walls of Bassano are clad with ivy; the sidewalks are paved with marble found in the vicinity, and the streets with granite and other materials. The partly ruined castle of Ezzelino in the centre of the town is now occupied by the archbishop.



Bassano.

The museum in the piazza San Francisco contains an extensive library, a picture gallery, and collections of coins and rare engravings. The palace of the podesta contains frescoes and statuary. Near the town are the villa Rezzonico, famous for its extensive view and for works of art, and the villa Parolini, with a botanical garden. The town contains a number of convents, a gymnasium, and about 30 churches, several of which have paintings ex-

ecuted by the Bassano family. The Remondini printing establishment, once the first in Italy, is still of some importance, and has paper mills and a school of engraving annexed to it. The trade is considerable, especially in silks. The chief manufactures are woollen cloths, straw hats, and leather. Ezzelino resided here for some time. The town was fortified and improved by Francis of Carrara, lord of Padua, and was ruled by the Visconti of Milan, who in 1404 ceded it to the republic of Venice, of which it became a separate province with a local administration. In the 16th century it suffered during the war of the league of Cambray against Venice. On Sept. 8, 1796, Napoleon, after a forced march of two days from Trent, annihilated here the Austrian army under Wurmser. Battles were also fought here between the French and the Austrians in November, 1796, in 1801, 1805, and 1813. Napoleon raised Bassano to a duchy for the benefit of Maret. Canova was born in a village 10 m. from Bassano.

BASSANO, or **Bassan. I. Francesco da Ponte,** the head of a school of painters, called the Bassans, born in 1475, died in Bassano in 1530. He studied in Venice under Giovanni Bellini, and painted frescoes superior to those of his master. His best composition is a "Descent of the Holy Ghost," in a church at Oliero, near Bassano. He is called the elder Bassano, to distinguish him from his son. **II. Giacomo da Ponte,** commonly called Il Bassano, son and pupil of the preceding, the most celebrated member of the family, born in 1510, died in Venice in 1592. He derived his principal education from the cartoons of Parmigiano, and in copying Bonifazio and Titian. His picture of the "Nativity," in the church of San Giuseppe at Bassano, is his masterpiece, and a celebrated work in force of colors and chiaroscuro. **III. Francesco,** called the younger, son of the preceding, born in 1548, died in 1591. He was employed with Tintoretto in the palace of St. Mark, and executed there several frescoes after Paul Veronese. His best works are the fresco ceiling of the palace of the doges at Venice, representing the capture of Pavia.

BASSANO, Hugues Bernard Maret, duke of, a French statesman, born in Dijon, March 1, 1763, died in Paris, May 13, 1839. He was the son of a physician, received an excellent education, and went to Paris to practise law; but the outbreak of the revolution changed his plans, and he edited the *Bulletin* of the proceedings of the constituent assembly, which became the origin of the *Moniteur*, the official journal, and won for him great political influence. Although in favor of a constitutional monarchy, and one of the founders of the club of the Feuillants, he became in 1791 chief of a bureau in the ministry of foreign affairs, and was sent in 1792 on an extraordinary mission to London after the rupture of diplomatic relations with England. Failing in his negotiations with Lord Grenville, he returned to Paris, and losing his place during the reign of terror he resumed his editorial connection with the *Moniteur*. In July, 1793, he was appointed ambassador to Naples; but he and his travelling companion, the French envoy to Turkey, were captured by the Austrians in Switzerland and imprisoned in Mantua and Brünn about two years. He was finally exchanged for the daughter of Louis XVI., and was received in Paris with great distinction; but owing to his former opposition to the Jacobins, he received no public employment till 1797, when he was sent to Lille as one of the plenipotentiaries for the negotiation of peace with England. In 1798 the Cisalpine republic presented him with estates of the value of 150,000 francs as an indemnity for his captivity. Having formerly lived in the same house with Bonaparte, the latter on his return from Egypt greeted him as an old friend and employed him as private secretary. After the 18th Brumaire he became secretary general and subsequently secretary of state, officiating after the dismissal of Bourrienne as the chief director of the home office, manipulating the press and exerting immense influence over his master, whom he accompanied in almost all his campaigns and assisted in all his diplomatic negotiations. The ministry of foreign affairs having been placed under his direction in 1811, he signed in February and March, 1812, the treaties which he had negotiated with Prussia and Austria to secure the coöperation of those powers during the Russian campaign. Napoleon invested him with the duchy of Bassano, with an annual revenue of about 50,000 francs, besides presenting him with a palace and valuable property in Paris, and retaining him as his most intimate adviser even after he had removed him from the secretaryship of state and the ministry of foreign affairs. During the hundred days he resumed the former position, was made a peer on June 2, and remained by the side of the emperor at Waterloo. During the restoration he lived in exile at Gratz till 1820. Louis Philippe restored him to the chamber of peers in 1831, and in 1834 he acted for a few days as minister of the interior and president of the cabinet. He was restored in 1832 as a member of the academy. His interesting correspondence and literary productions have not yet been published.—His son, Napoléon Joseph Hugues Maret, duke of Bassano, born in Paris, July 3, 1803, was appointed in 1851 ambassador to Brussels, and in 1852 senator.—A younger son, Prince Eugène de Bassano, ruined himself in mining operations in Algeria. He published in 1848, with E. de Solms, *Projet de colonisation de l'Algérie par l'association.*

BASSANTIN, or **Bassantoun, James,** a Scotch astronomer and mathematician, born about 1504, died in 1568. He was a son of the laird of Bassantin, studied at Glasgow and on the continent, acquired renown and some fortune as professor of mathematics in the university of Paris and also as an astrologer, returned to

Scotland in 1562, and warmly supported the earl of Murray. His principal work on astronomy passed through several editions, and was translated by Tornæsius from French into Latin (Geneva, 1599). He had scarcely any knowledge of Latin and Greek, and is supposed to have received literary assistance in the preparation of his various writings, one of his treatises being entitled *Musica secundum Platonem*.

BASSANVILLE, Anaïs Lebrun de, countess, a French writer, born in 1806. She was educated under the direction of Mme. Campan, and has acquired renown by her numerous school books, novels, &c., including *Aventures d'une épingle* (1845); *Les mémoires d'une jeune fille* (1849); *De l'éducation des femmes* (1861); *Les salons d'autrefois, souvenirs intimes* (1861–'4); *Les ouvrières illustres* (1863); *Les secrets d'une jeune fille* (1863); and *Le code du cérémonial, guide des gens du monde* (1867). She founded the *Journal des jeunes filles*, edited the *Moniteur des dames et des demoiselles* and *Le Dimanche des familles*, and has displayed much literary industry in other directions.

BASSEIN. I. The chief town of a district of the same name in the province of Pegu, British India; pop. about 3,500. It is situated on a channel formed by an offset of the Irrawaddy, which is here called Bassein river, and further down the Negrais. The channel offers safe anchorage for the largest ships. The town was captured by the English May 19, 1852. **II.** A decayed town in the Poona division of the presidency of Bombay, on an island of the same name (area, 35 sq. m.), separated by a narrow channel from the mainland of North Concan, and affording a shelter for shipping, 28 m. N. of Bombay. It was once a prosperous place, with many churches and other public buildings, ruins of which form the chief attraction in the now desolate city.

BASSELIN, Olivier, a French poet, born at Val-de-Vire, Normandy, died about 1418. He was a fuller, and became famous for his drinking songs, which were first called *Vaux-de-Vire* from the place of their origin, whence the French word *vaudeville*. Jean le Houx had them printed about 1576, and the most recent edition is by Julien Travers (Avranches, 1833).

BASSES-ALPES, a S. E. department of France, formerly part of Upper Provence, bounded by Italy and the departments of Alpes-Maritimes, Var, Bouches-du-Rhône, Vaucluse, Drôme, and Hautes-Alpes; area, 2,685 sq. m.; pop. in 1872, 139,332. It is watered by the Durance and its tributaries. In density of population it is exceeded by all the other departments of France. The greater part is covered by ranges of mountains, between which are fertile valleys. Excellent pasturage is found upon the sides of the mountains. Plums are produced in large quantities in the vicinity of Digne, which are dried and known in commerce as *prunes de Brignoles*. The department is divided into the arrondissements of Digne, Sisteron, Barcelonnette, Castellane, and Forcalquier. Capital, Digne.

BASSES-PYRÉNÉES, a department of France, bounded S. by the Pyrenees and W. by the bay of Biscay; area, 2,945 sq. m.; pop. in 1872, 476,700. It was formed from Béarn, Navarre, and a part of Gascony. About half the surface is covered with pastures and marshes; forests occupy one sixth; the rest is fertile. The mountains give birth to numerous torrents, the principal of which are the Adour, Bidouze, and Nive. The chief mineral springs are those of Eaux-Bonnes and Eaux-Chaudes. There is much industrial and commercial activity, and an active trade is carried on through Bayonne. It is divided into the arrondissements of Pau, Bayonne, Orthez, Oloron, and Mauléon. Capital, Pau.

BASSE-TERRE. I. The chief town of the island of St. Christopher in the British West Indies, on the S. W. coast, at the mouth of a small river; pop. about 9,000. It is well built and protected by three forts. The trade is considerable. A sandy beach prevents the near approach of laden vessels, and ships are loaded and unloaded from a lighter called a "Moses," which is thrown up in the lull of the surf. **II.** The chief town of the French island of Guadeloupe, West Indies, situated in the W. division of the island and on its S.W. coast; pop. about 13,000. The former capital, Pointe-à-Pitre, destroyed by an earthquake in 1843, possessed a better harbor than Basse-Terre, which however became the principal seat of commerce, on account of its proximity to the producing portion of the island.

BASSI, Laura Maria Catarina, an Italian scholar, born in Bologna, Oct. 31, 1711, died there, Feb. 20, 1778. At the age of 21 she sustained successfully in public a philosophical thesis in Latin against seven professors, and received the degree of doctor, the senate appointing her professor of philosophy. Afterward she taught for over 30 years experimental physics and languages. She was the wife of Dr. Giuseppe Verati, and had several children.

BASSOMPIERRE, François, baron de, a French courtier, born in Lorraine, April 12, 1579, died Oct. 12, 1646. Henry IV. appointed him member of the council and commandant of a regiment, and under Louis XIII. he was made marshal and envoy to Spain, Switzerland, and Great Britain. He took part in the siege of La Rochelle, and served against the Huguenots in other places. He became obnoxious to Richelieu, who sent him to the Bastile (1631), where he was detained 11 years till the cardinal's death. While in prison he wrote *Mémoires du maréchal de Bassompierre depuis* 1598 *jusqu'à son entrée à la Bastille en* 1631 (Cologne, 1665). Previous to his arrest he was reported to have consigned to the flames more than 6,000 love letters. One woman, who had borne him a son, spent eight years in lawsuits to compel him to marry her; but he was already secretly married to the princess of Conti, Louise de Lor-

raine, who died of grief when she heard of his death. He was as fascinating and accomplished as he was reckless and unprincipled.

BASSOON, a musical wind instrument made of wood, in the shape of a long tube, which is played by means of a reed through a bent brass mouthpiece. It is called by the Italians *fagotto*, because composed of two pieces of wood bound together like a fagot, and serves as the base to the clarinet and oboe, its tone being closely assimilated to that of the latter. It has a compass of three octaves, from double B flat to B flat in alt, and from its sweet and plaintive tone is an agreeable instrument in the orchestra, where for many years, however, it occupied a very subordinate position. It was invented by Alfranio, a canon of Pavia, in 1539, and was introduced into England by Handel about 1720.

BASSORAH, or **Basra,** a town of Asiatic Turkey, in the eyalet of Bagdad, on the right bank of the Shat-el-Arab, about 70 m. from its mouth in the Persian gulf; pop. reduced by wars, pestilences, and inundations from 150,000 about 1750 to not much over 4,000 in 1872. It is still an important commercial and maritime station. The soil of the surrounding country is fertile, but few articles are cultivated except dates, of which immense quantities are sent to Persia and India. Horses are also exported. Copper, once exported, is at present imported, as well as coffee, indigo, rice, spices, and timber. The English Tigris and Euphrates company have had a station here since 1862. Old Bassorah, the ruins of which are 8 m. S.W. of the present town, was celebrated as the chief emporium of the caliphs of Bagdad. One of the first Mohammedan learned schools was founded here in the 4th century, and the town was called *Kubbet-el-Islam* (the cupola of Islam). In the middle of the 12th century it had already begun to decline, the poet Edrisi relating that he found its "7,000" mosques deserted. The present town dates from the 17th century, and was desolated in the 18th by wars between the Turks and the Persians. It was occupied from 1832 to 1840 by the Egyptians.

BASS ROCK, an island rock near the mouth of the frith of Forth, Haddingtonshire, Scotland, 3 m. N. E. of N. Berwick. It is nearly round, about 1 m. in circumference and 400 ft. high, composed of green or clink stone, traversed by a vast cavern from N. W. to S. E., inaccessible on all sides except on the S.W., where it is impossible to land in stormy weather. The precipices rising out of the sea give shelter to great numbers of solan geese and other aquatic birds. Charles II. purchased the rock for £4,000 as a prison for covenanters. A handful of partisans of James II. held it from June, 1691, to April, 1694, against all the forces sent by William III., who had the fortifications demolished in 1701. In 1706 the rock passed into the possession of the Dalrymple family, and they derive a revenue by letting it to a keeper, who sells the young geese and receives fees from visitors.

BASS STRAIT, a channel between Tasmania and New South Wales, about 250 m. long and 140 wide. At the E. entrance stands Flinders island, and at the W. King's island. It abounds in small islands and coral reefs, which materially obstruct the navigation. Tin was found in one of the islands in 1872.

BASSUTOS, a tribe or a political union of several tribes of the Bechuanas, S. Africa. Their territory, which covers an area of about 12,700 sq. m., is bounded E. by Caffraria and Natal, N. and W. by the Orange Free State, and S. by Cape Colony; pop. estimated at about 100,000. The Bassutos are indebted to a chieftain named Moshesh for improvements in agriculture, the introduction of something like civilized manners, and the organization of a regulated administration. Protestant missionaries, chiefly those of the French *société des missions évangéliques*, have been laboring among them since 1830, and have numerous stations. After protracted wars with the Orange Free State, the Bassutos had on March 26, 1866, to conclude a peace by which a portion of their territory was ceded to that republic; the remainder, with about 60,000 inhabitants, was on March 12, 1868, annexed to Natal.

BASSVILLE, or **Basseville, Nicolas Jean Hugou** or **Husson de,** a French writer and diplomatist, assassinated in Rome, Jan. 13, 1793. Previous to being appointed in 1792 as secretary of legation at Naples, he was known as a teacher, author, and journalist. He was sent from Naples to Rome for the protection of French commercial interests, and while there the convention sent to him a M. Flotte with instructions to hoist the republican flag on the consular building, and ordering the French residents to make similar demonstrations. This being resisted by the mob, a riot broke out, during which Bassville was killed. The convention took up the case as a violation of international law, adopted his son, and forced the Roman see to pay 300,000 francs to be divided among the victims. The Italian poet Monti made this event the subject of a powerful poem, entitled *Bassvilliana;* and other writers have commemorated Bassville's fate, though he had much less to do with displaying the republican emblems than the subordinate agent Flotte.

BAST, or **Bass,** the inner bark (*endophlœum*) of dicotyledonous plants, contiguous to the woody circle. It is the fibrous part of the bark, and consists of a tissue of cells, including the so-called laticiferous vessels. Less frequently it occurs in the pith and leaves of dicotyledonous, and in the stems and leaves of monocotyledonous vegetables. It originates out of the *cambium* (organizing tissue), and belongs to the vascular bundle. The bast cell grows long at the expense of the surrounding parenchyma, without producing new cells. The wood and bast cells of monocotyledonous plants are not easily distinguishable. There are none in the cryptogamous. For the plant itself, as well as

for technical, medicinal, and other purposes, the bast cell is of the highest importance. It conducts sap, serves to exchange and alter the vegetable matters, produces nutritious or poisonous or medicative matters, and is largely used in the fabrication of cloth, ropes, mats, sacks, &c. The bast cells are disposed and developed variously in different plants; occurring in rows, wreaths, more or less spread bundles, or single within the parenchyma. In some plants bast is formed but once, in others every year. Some are simple, others branched; some primary, others secondary; some ever flexible, others changing into wood. They are most developed toward the outside. While young they contain a granulary liquid, which disappears by the thickening of their walls. In the *chelidonium majus* this liquid remains as yellow milk. The laticiferous cells of the *apocyneæ*, *euphorbiaceæ*, and *compositæ* (dandelion, lettuce, &c.) are developed just like the fibrous cells of flax. Young bast cells, when treated by a solution of iodine and chloride of zinc, become pale blue, the older ones violet, the full grown pink. Thickened cells are plainly stratified, and their walls often become contiguous by the disappearance of the cavity. The walls exhibit various designs, spiral or other lines, more or less constantly, according to the variety of the plants, and also to the treatment by alkali and acids. By such treatment, and by the microscope, the nature of the various fabrics made of bast may be determined. Thomson and F. Baur have thus demonstrated the sheets around Egyptian mummies to be of linen. The degree of decomposability, of contraction, of twisting, and the length, density, and form of the single cells of the bast, vary in different plants. They are very long in flax, hemp, in some nettles, spurges, &c.; very short in cinchona. Cotton consists of long hairs, and not of bast cells, which it very much resembles otherwise. The bast cells of monocotyledonous plants are mostly lignified. The unlignified are very hygroscopic (water-attracting), contain often chlorophyl (the green matter of plants), and more frequently a sort of milk, which is condensed into gum elastic, gutta percha, opium, &c. The lignified, on the contrary, conduct sap but a short time, become filled with air, and thus dead for the plant. No bast cell has pits, but the *abietineæ* have sieve pores or canals.—The uses of bast are manifold. Flax bast is soft, flexible, seldom with swellings; hemp bast is very long, stiffer and thicker than flax, more stratified; nettle (*urtica dioica*) bast resembles cotton, has swellings, and is thicker than hemp. Branched and lignified bast cells of great beauty are those of the mangrove tree (*rhizophora mangle*), and the secondary ones of *abies pectinata*. Among the monocotyledonous bast fibres, those of the New Zealand flax (*phormium tenax*) are the most remarkable, being found in bundles near the margin of leaves. They resemble hemp, are very white, sometimes yellowish, very long, and contain much lignine, somewhat stiff, but very tough, and fit for stout ropes. In palms a highly developed body of lignified bast surrounds their vascular bundle, while particular bast bundles are found also in the bark, leaves, and interior of the stem. Of this, the husk of the cocoanut is an example. A similar disposition exists in the *dracæna reflexa*, and in some *aroideæ*. Everybody knows the tenacity of the bast of the linden tree, which is hence also called basswood. The Chinese grass cloth is made of bamil, *Bœhmeria puya*. Manila hemp comes from the *musa textilis;* rice bags are made in India from *antiaris saccidora*. The Latin name of bast, *liber*, was used to signify book, from the use of bast in ancient times for writing on. Our word book also means, originally, beech (*fagus*), from the same use of its bast before the invention of other materials.

BASTARD (old Fr. *bastard*, of uncertain derivation), a person born without lawful parentage. By the English law a child born after the marriage of its parents, whatever may be the time, is legitimate, unless non-access of the husband, who is otherwise presumed to be the father, can be proved. Birth of a child after the death of the husband, if within a possible period of gestation commencing from a time anterior to such decease, is also held to be legitimate; and this period has in some instances been allowed of an extravagant extent, but is now, in accordance with the opinion of medical writers as to the limit of any accidental variation from the accustomed course, fixed at 10 months. To avoid any question which might arise in cases of second marriage by the widow soon after the death of the husband, it was a rule of the civil law that she should be prohibited from marrying *infra annum luctus* (within the year of mourning), which, according to the ancient Roman calendar, was 10 months; and the same rule was adopted by the Saxons and Danes, except that the year was 12 months. By the civil and canon law the intermarriage of the parents after the birth of a child rendered such child legitimate; and this is the law of Scotland, France, Holland, and Germany. The ecclesiastics unsuccessfully urged the parliament of Merton in the reign of Henry III. to adopt this rule of the canon law; it has never been accepted in England. A bastard, by the English common law, being held to be *nullius filius*, cannot take real or personal estate as the heir of either parent, nor has he even the name of the father or mother, but may assume it or any other name, and is known in law only by such assumed or reputed name. He is, however, able to take real or personal estate by will or other conveyance, and to dispose of the same in a similar manner; but only his children can inherit, and in case he dies intestate without children, his real estate escheats to the crown, and his personal estate is disposed of by administration for the benefit of the crown or its grantee.

The father at common law was not bound to provide for a bastard child, but by the statutes provision is made for compelling the father to give security for the maintenance of a child, so as to prevent its becoming a charge upon the parish.—In the United States important modifications have been made in respect to the rights of illegitimate children. In most of the states a bastard may take by inheritance as heir or next of kin of the mother, and the mother may inherit from her illegitimate child; but, with a few exceptions, the common law rule that the intermarriage of the putative father and mother does not legitimate a child born before the marriage still obtains. The provisions of the English statutes in respect to compelling the father to give security for the maintenance of a child have been generally adopted in this country, the object being, in general, only to indemnify the town or county from the charge of the child as a pauper.

BASTIA, a seaport town on the N. E. coast of the island of Corsica, 66 m. N. N. E. of Ajaccio; pop. about 20,000. It is built in the shape of an amphitheatre, on a mountain; has narrow angular streets, and is defended by

Bastia.

modern forts. It has a small but convenient harbor, is the chief commercial city of Corsica, and the seat of its highest courts. The inhabitants carry on a trade in skins, wine, oil, wax, and fruits. Bastia was founded in 1380, by the Genoese, Leonel Lomellino. In 1745 the English took it, but were compelled to surrender it in the following year. In 1748 it successfully defended itself against the Austrians and the Piedmontese. After the union of Corsica with France, in 1768, the English held it for a short time, and in 1794, under Admiral Hood, they took the city after a long siege.

BASTIAN, Adolph, a German traveller, born in Bremen, June 26, 1826. He is the son of a merchant, was educated as a physician, and in 1851 went to Australia as the surgeon of a sailing vessel. He travelled in South America, the West Indies, the United States, China, India, and South Africa, and afterward made a journey through Burmah, Siam, Java, the Philippines, Japan, and China, returning to Europe through Asiatic Russia. Since 1868 he has been director of the ethnographical collection in the Berlin museum. In 1869 he established the *Zeitschrift für Ethnologie*, the organ of the Berlin anthropological and ethnological society. His principal works are: *Die Völker des Oestlichen Asiens* (6 vols., Leipsic and Jena, 1866–'71); *Afrikanische Reisen* (Bremen, 1859); *Der Mensch in der Geschichte* (3 vols., Leipsic, 1860); *Beiträge zur vergleichenden Psychologie* (Berlin, 1868); *Sprachvergleichende Studien, besonders auf dem Gebiete der indochinesischen Sprachen* (Leipsic, 1870); and *Die Rechtsverhältnisse der verschiedenen Völker der Erde* (Berlin, 1872), a learned contribution to comparative ethnology.

BASTIAN, H. Charlton, an English physician and physiologist, born at Truro, April 26, 1837. After a brilliant course of study he was admitted member of the royal college of surgeons in 1860, in 1860–'63 was assistant curator in the anatomical and pathological museum of University college, London, and in 1864–'6 assistant medical officer to the Broadmoor criminal lunatic asylum. In 1866 he became assistant physician and lecturer in St. Mary's hospital; in 1867, professor of pathological anatomy in University college, and assistant physician to the hospital; in 1868, assistant physician to the hospital for the paralyzed and epileptic; and in 1871 physician to University college hospital. In 1871 he published "The Modes of Origin of Lowest Organisms," and in 1872, "The Beginnings of Life" (2 vols.). He has also contributed many valuable papers to various medical and philosophical journals. Dr. Bastian, the youngest member of the royal society, has gained an excellent reputation as a general pathologist, and is an authority on the pathology of the nervous system. The study of the microscopical character of the blood in acute diseases led him to question accepted views in regard to the lowest forms of life and their mode of origin, and he has prosecuted the investigation of this subject with such zeal and originality that he is now regarded as at the head of the school of heterogenists or believers in the doctrine of spontaneous generation.

BASTIAT, Frédéric, a French economist, born in Bayonne, June 29, 1801, died in Rome, Dec. 24, 1850. He was educated for commercial pursuits, but the bent of his mind was toward political economy; and a large inheritance left him in 1825 enabled him to devote himself to that study. In 1840 he travelled through Portugal and Spain; in 1844 he made his first appearance as a writer in an article attacking the protective system, published in the *Journal des économistes;* in 1845 he visited England, and made the acquaintance of the Manchester school, one fruit of which was a work entitled *Cobden et la ligue, ou l'agitation anglaise pour la liberté des échanges* (1 vol. 8vo, Paris, 1845); in 1846 he took an active part in the establishment at Bordeaux and at Paris of a free-trade association, becoming its Parisian secretary, and the chief editor of the journal *Le libre échange.* At this time he also came forward as one of the opponents of the socialists of his country, whose idea of the omnipotence of the state he combated. In 1848 he was chosen a member of the constituent and then of the legislative assembly, but his health did not allow him to appear at the tribune. He gained a great reputation by his controversies with Proudhon. His labors exhausted him, and his physicians ordered him to Italy in September, 1850. Among his most striking works are the pamphlet *Capital et rente, gratuité du crédit* (Paris, 1849), and *Harmonies économiques,* left incomplete at his death. The last is an attempt to demonstrate that the laws of economy all tend concurrently and harmoniously to the amelioration of human life. This work was the occasion of a prolonged controversy in the Paris *Journal des économistes* between M. Bastiat and his friends and Mr. Henry C. Carey of Philadelphia, who contended that the principle of economical harmony was a discovery of his own. An American translation of M. Bastiat's "Essays on Political Economy" was published in Chicago in 1869.

BASTIDE, Jules, a French publicist and politician, born in Paris, Nov. 22, 1800. The son of a man of business, he became a timber merchant after having studied law, and participated in many revolutionary attempts against Charles X. He was one of the first French carbonari, and on the outbreak of the revolution of 1830 he was said to have been the first to hoist the tricolor flag on the Tuileries. In 1832 he was arrested at Grenoble as an abettor of republican movements, and after his release he was the leader of the riot which broke out (June 5) during the funeral of Gen. Lamarque. He was sentenced to death, but fled to England, and on his surrendering to the French authorities in 1834 he was acquitted. After the death of Armand Carrel he and his commercial partner Charles Thomas became joint editors of the *National* newspaper, from 1836 to 1846. In 1847 he and Buchez founded the *Revue nationale,* and continued to advocate moderate republican institutions as compatible with the Roman Catholic faith. In the provisional government of 1848 he was secretary general, and under Lamartine's executive commission minister of foreign affairs, and for a short time of the navy, being also a member of the constituent assembly. He remained in the cabinet under Cavaignac, and left it Dec. 20. He assisted in preparing the second edition of the *Histoire parlementaire de la révolution française,* by Buchez (5 vols., 1845–'7), and published the first volume of *Histoire de l'assemblée législative* (1847), but did not continue this publication, which was to have comprised 25 volumes. His more recent works include *La république française et l'Italie en* 1848 (Brussels, 1858), and *Guerres de religion en France* (2 vols., Paris, 1859).

BASTILE (Fr. *la Bastille*), the state prison and citadel of Paris, begun in 1369 by Charles V., enlarged in succeeding reigns, and destroyed by the people in 1789. Situated at the gate St.

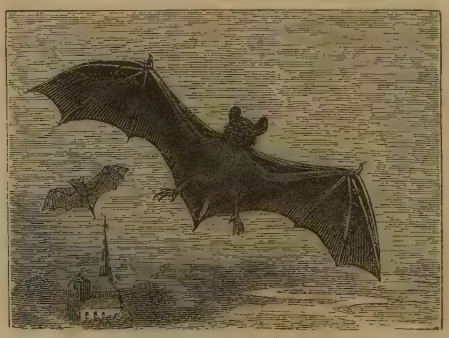
Antoine, it had when completed eight huge round towers, connected by curtains of massive masonry, and was encircled by a wide ditch 25 ft. deep, which was usually dry. This ditch was surrounded by a high wall, to which was attached a wooden gallery called "the rounds," accessible by two staircases, and guarded by sentinels. The administration of the Bastile in the 18th century was vested in a governor, a royal intendant, a major, a major's aid, a surgeon, and a matron. The garrison was composed of 100 men, commanded by two captains, a lieutenant, and sergeants. The cells were situated in all the towers, the walls of which were at least 12 ft. thick, and at the base 30 or 40. Each cell had an aperture in the wall, defended by three iron gratings, the bars of which were an inch thick and so arranged that although the openings in each grating were really of 4 inches, only 2 inches were left unobstructed. The dungeons were 19 ft. below the level of the courtyard, and 5 below that of the ditch,

with no opening but a narrow loophole communicating with the ditch. The Bastile could contain 50 state prisoners in solitary cells. When a greater number were placed within its walls, they were confined in cells opening on the ditches which carried off the ordure and sewerage of the prison, amid odors insufferable. They were miserably fed, but this was owing rather to the abuses of the governor than to the government, which paid enormous sums for the maintenance of the state prisoners. Benneville asserts that in his time Bernaville, who was then governor, had a great number of prisoners at all prices, up to 25 francs a head *per diem*, and that their daily subsistence did not cost him on an average 20 sous. There was a regular tariff of expenses for the table, lights, and washing of all prisoners, according to their rank. Thus a prince of the blood was allowed 50 francs a day; a considerable burgher, or an advocate, 3 francs; and the members of all the inferior classes, 2 francs and 10 sous, the same being the rate allowed for the guards, wardens, and servants of the prison. The inhuman treatment to which prisoners in the Bastile were subjected has few parallels in the history of penal cruelty. Put there without accusation or trial, on a simple *lettre de cachet*, allowed no communication with friends, their final fate was dependent upon the caprice of despotism and unknown to the world.—Up to the date of the accession of Charles VII. the Bastile continued to be merely a royal fortress, when it became a state prison, under the government of Thomas Beaumont, who was in command when in 1418 the populace broke into its precincts and massacred the princes of the house of Armagnac. Within the walls of this prison died Charles de Gontaut, sieur de Biron, marshal of France, for treason against Henry IV. Here also were imprisoned Bassompierre, Marshal Richelieu, Voltaire, Latude, who in vain made an extraordinary escape, and that victim of Louis XIV. known as the Man in the Iron Mask, whose identity has never been absolutely established. (See Iron Mask.) After the death of Louis XIV. the Bastile degenerated from being a place of incarceration for suspected princes, pretenders to the throne, and subjects too powerful for the state, into a common jail. The imprisonment of Blaizot, the king's librarian, by the minister De Breteuil, nominally at the king's order, brought to light the whole system of iniquity. Blaizot was delivered, but De Breteuil was not punished. On July 14, 1789, after a brief defence by Delaunay, then governor, and the guard consisting of 82 invalids and 32 Swiss, the Bastile was captured by the people, ransacked, and on the following day its towers were razed and its dungeons filled with the copings of its battlements. Seven persons were found in its cells and dungeons: one, the count de Solage, a prisoner since his 11th year; another, Tavernier, who, after 10 years at the Marguerite islands, had passed 30 years in the Bastile, and who reappeared on his liberation bewildered, with a broken intellect, like a man awaked from a sleep. Records of horrors even worse than this were found inscribed on the registers of the prison. On its site now stands the column of July, which was erected in memory of the patriots of 1789 and 1830.

BASTION. See Fortification.

BASTROP, a S. central county of Texas, intersected by the Colorado river; area, 1,001 sq. m.; pop. in 1870, 12,290, of whom 5,233 were colored. It is watered by numerous small affluents of the Colorado, which is navigable for steamboats during six months in the year. The soil is generally fertile and the surface moderately uneven. Lumber is abundant, and lignite is found. The chief productions in 1870 were 356,874 bushels of corn, 8,728 bales of cotton, and 6,690 lbs. of wool. There were 6,781 horses, 1,339 mules and asses, 6,895 milch cows, 37,805 other cattle, 1,957 sheep, and 19,383 swine. Capital, Bastrop.

BAT, a mammiferous quadruped, whose different genera constitute the order *cheiroptera*. Its general form is disposed for flight; an expansion of the skin is stretched between the



Common Bat (Vespertilio communis).

four limbs and the greatly elongated fingers of the anterior extremities; this flying membrane is naked, or nearly so, on both sides; the breast has mammæ; the clavicles are very strong; the forearm is incapable of rotation in consequence of the union of the bones. The bats consist of two very distinct groups, characterized mainly by the structure of the teeth. The first, containing the genera *pteropus* and *cephalotes*, is frugivorous, has the molar teeth with flattish crowns, obliquely truncated and longitudinally grooved, 3 joints in the fingers, generally provided with a nail on the second finger, and the tail wanting or rudimentary. The second group, containing the genera *vespertilio*, *phyllostoma*, *nycteris*, &c., has the molars with sharp points like the true insectivora, showing at once the different nature of their food. The skeleton of the bats combines a great degree of lightness with peculiarities in the anterior extremities suitable for purposes of flight. The head is the longest in the frugivorous group; in all, the portion of the

temporal bone containing the organ of hearing is much developed; they all have canine and incisor teeth, the latter varying in number from 2 to 4 in the upper, and from 2 to 6 in the lower jaw; the molars also vary from 3 to 6 in each jaw. The vertebræ of the neck are very broad; those of the back and loins are simple and almost without spinous processes, and much compressed at the side; the sacrum is very long and narrow; the tail, when present, is short, and of use to support the interfemoral membrane and direct the flight. The number of vertebræ in *pteropus* is probably less than in any other mammal, being only 24. The ribs are remarkably long, as is the breast bone; the upper part of the latter is greatly expanded laterally, to give a firm support to the very strong collar bones; the front of the bone has also a crest, like the keel of the bird's sternum, and for a similar purpose, viz., the origin of the powerful muscles of flight. As the collar bone, so the shoulder blade is highly developed, especially in the active insectivorous bats; the arm bone is very long and slender; the forearm consists of the usual two bones, but the ulna is quite rudimentary, and is united to the radius; the latter is very long and robust, and cannot be rotated, an admirable provision for an animal whose progression requires a constant resistance to the air. But the most remarkable modification of the anterior extremity is in the hand; the bones of all the fingers, except the thumb, are extremely elongated, for the attachment of the flying membrane; the thumb is comparatively short, and provided with a hooked nail, by which the animal can climb or suspend itself. The thigh bone is of moderate size, and so turned that the front surface is directed nearly backward; the fibula is quite small and slender, and has the remarkable condition of deficiency in its upper portion, the usual state of things being the reverse. The foot is not developed like the hand, the only peculiarity being a long-pointed bony process arising from the heel, and enclosed in the membrane between the legs; the toes are 5 in number, nearly equal, and furnished with hooked nails, by which they suspend themselves when at rest, with the head downward. The seeming deformity and ugliness of the bats led the ancients to consider them as impure animals; even ancient naturalists display the grossest ignorance concerning them. Aristotle, Pliny, and others, considered them as birds; these opinions were copied during the middle ages, and are even now entertained by many persons. The faculty of flight depends on an entirely different organization in the bird and in the bat. The principal part of the bat's flying membrane is stretched between the enormously elongated fingers, and from them reflected to the posterior extremities; but in the bird, the parts which correspond to fingers are so rudimentary that the hand can hardly be said to exist; the wings extend beyond it, bearing the quills, the principal part, which belong to the epidermic system; the wings in the two cases are in no respects homologous. The bat, so active in the air, is very awkward on the ground. When the animal attempts to walk, the wings are shut and become fore feet; the hook of one thumb is fixed to some object, and by it the body is pulled forward and to one side, the next step being by a similar movement by means of the hook of the other thumb. By this diagonal tumbling, the bats progress on a level surface; the length of the wings prevents them from rising from such a situation, and it is only when they gain some trifling elevation that they can commence their flight. In the air they are perfectly free, and when desirous of rest they seek some dark retreat, from the top of which they can hang, head downward, suspended by their hind claws; in case of danger, they have only to loose their hold, when their wings are at once spread. The diminutive size of the eyes is well known, and familiarly expressed in the very common saying, "as blind as a bat." The insectivorous group, whose ears are largely developed, have very small eyes, placed almost within the auricle and concealed by the hair; but in the fruit-eating genera the eye is of the usual size, as is also the ear. The diminutive eye is compensated for by the great development of the organ of hearing; the external ear is enormously large, in the *pleiotus auritus* nearly

Long-eared Bat (Pleiotus auritus).

as long as the body; there is a proportionate increase in the extent of the internal ear. The organ of smell in many insectivorous bats, as the *rhinolophidæ*, is exceedingly acute; it is provided with folds of the integument, of great size and the most grotesque forms, rendering their physiognomy like that which would be produced by a nose turned inside out and complicated by a hare-lip. These appendages are found in the groups whose habits lead them into the darkest caverns,

where there is not even a ray of light, and are intended, by increasing the delicacy of the sense of smell, to act as substitutes for eyes in situations where vision is impossible. Bats have such an extraordinary exaltation of the sense of touch, that Spallanzani was led into the belief that they had a sixth sense; his experiments showed that they could fly with perfect accuracy in the dark, avoiding every obstacle, even after the eyes were put out and the ears and nose completely stopped up. But Cuvier discovered that this exquisite sense of touch resides in the flying membrane. This membrane arises from the skin of the flanks, and consists of an abdominal and a dorsal leaflet, united into an exceedingly thin and delicate network; it includes not only the arms and hands, but the hinder extremities, being prolonged more or less, according to the genera, between the legs, and spread the length of the tail, forming a sensitive surface entirely disproportionate to the size of the body; to increase its sensitiveness, it is entirely or nearly destitute of hair. The bat, therefore, is made acquainted with the distance of bodies by the different modifications impressed upon this membrane by the impulse of the air. The only peculiarity in the nervous system is the large size of the spinal cord in the lower cervical and dorsal region, from which arise the nerves of sensation distributed to the wings. In the *nycteris*, an African genus, the skin adheres to the body only at certain points, and by a loose cellular membrane, and is capable of being inflated with air by a communication with the large cheek pouches; this inflation may be carried to such an extent that the animal resembles a balloon with head, wings, and feet. The mouth of the bat is uncommonly large, affording great facilities for the capture

Vampire Bat (Vampirus spectrum).

of insects on the wing. In the genus *vampirus* or *phyllostoma*, peculiar to America, the tongue is provided at its extremity with a circular row of wart-like elevations, forming a complete suctorial disk; by means of this these animals are enabled to suck the juice of fruits and the blood of animals. By mistake this faculty has been attributed to some of the large species of the *pteropus* of Asia, and hence have arisen the fearful stories of the fabulous vampire, which destroyed people at night by sucking their blood, fanning their victims into unconsciousness by the flapping of their wings. The vampire bat is a large South American species, of the genus *vampirus*, whose natural food is insects, but which, if pressed by hunger, will suck the blood of poultry, cattle, and even of man; the blood is obtained entirely by suction from the capillary vessels, and not through any wounds made by the teeth; the stories told by travellers are much exaggerated, as the animal is harmless and not at all feared by the natives. The insectivorous bats have the simple stomach and short intestines of the carnivora; while the frugivorous

Flying Fox or Roussette (Pteropus rubricollis).

species have a complicated stomach and a long alimentary canal.—Bats are natives of all the temperate and tropical regions of the globe; those of North America belong chiefly to the *vespertilionidæ*. The large East India species, the roussettes, of the genus *pteropus*, are extensively used as food. The fur of bats is generally exceedingly fine and soft. Bats fly to a considerable height and with great rapidity; they are nocturnal in their habits, avoiding the light and noise of day; in the warm summer evenings they sally forth in search of prey, and themselves fall easy victims to the owls and birds of night and to any snare that may be set for them; they pass the winter, and indeed the greater part of the year, in a state of torpidity. The *cheiroptera* are intermediate between the quadrumana and the true insectivora. The *galeopithecus*, or cat-monkey, of the Indian archipelago, presents many characters of the

cheiroptera, though belonging to the quadrumana; the frugivorous genera approach the quadrumana in their teeth, while the insect-eaters resemble the true insectivora in their dentition; we find the monkey characters also in the free movements of the thumb, the deep divisions of the fingers, the pectoral situation of the breasts, the cheek pouches of many, and in the organs of generation and digestion. The bats differ from the quadrumana especially in the great development of the breast bone and in the impossibility of rotating the forearm.—North America has the following bats: *Vespertilio Noveboracensis*, *V. pruinosus*, *V. subulatus*, *V. noctivagans*, *V. Carolinensis*, *V. monticola*, *V. Virginianus*; *molossus cynocephalus*, *M. fuliginosus*; *plecotus Lecontii*, *P. Townsendi*.

BATAK, a remarkable race of the island of Sumatra. They inhabit that portion called Batta, or Battas, bounded N. by Acheen and S. by the ancient Malay territory of Menankabow, while on the east and west they are hemmed in by Malay colonies, which confine them to the mountainous region and plateaus in which the rivers Ledang, Bila, Burumon, and Batang Gadis have their sources; area, 20,500 sq. m.; pop. about 350,000. They have a written character, entirely original, forming an alphabet of 22 substantive letters and 5 vowel marks. They write from left to right, for ordinary purposes, upon polished joints of bamboo. Their books are composed of the inner bark of a species of palm cut into long slips and folded in squares, leaving part of the wood at each extremity to serve for the outer covering. Their literary works are chiefly rude treatises on the medical properties of plants, chronicles, stories of necromantic feats, and works on divination, which latter they consult on all important occasions. They are cannibals, eating the flesh of criminals, prisoners of war, and such others as may for any cause bring upon themselves the anger of the people. The victim is attached to a stake, and pierced with kreeses and lances until death ensues, when he is violently mangled and eaten. This degradation of the dead bodies of their enemies is their highest ideal of revenge or retributive justice, as is shown by the extreme respect they pay to the remains of those whom they esteem. Their habits are of the most disgusting character. Their single garment (*sarang*) is never washed, but is worn until it actually falls to pieces; their cooking and household utensils are simple, and are never cleansed. They seem, indeed, to have literally no idea of the meaning of cleanliness. The entrails of animals are considered by them the greatest delicacy; but they are also fond of almost every kind of meat, and even eat beetles and other insects. They live in houses of considerable size, each containing one room, in which, however, several families often reside together. The buildings have no windows, and only a few holes near the roof to permit the passage of smoke from the fires constantly burning on the floor. The houses are raised from the ground by posts; they are painted and carved, sometimes with no small skill, and are covered by thatched roofs. The entrance is a small opening closed by a kind of portcullis, and is reached by a ladder. Under the house, between the rows of posts, is the shelter for their cattle and poultry. The religion of the Bataks is simple. They are pagans and idolaters, although for centuries surrounded by a Mohammedan population. Their deities have Sanskrit names: *Batara-Guru*, the supreme good spirit; *Suraya-Guru*, his vicegerent; and *Naga-Padoha*, the spirit of evil. In taking a solemn oath, they cut the throat of a chicken after the manner of the Chinese. They understand the smelting and forging of iron, the raising of rice by irrigation, the culture, weaving, and dyeing of cotton, and have domesticated the ox, horse, buffalo, and hog. One portion of their territory, Padang Luwas (wide plain), is a bleak, treeless steppe, over which a desiccating, scorching wind blows from the west for months together. On the other hand are the beautiful and fruitful valleys of Mandeling, protected N. and S. by the lofty peaks of Barapi and Mali, and bordering the banks of the Batang Gadis (virgin river), which runs between the central mountains of Sumatra. These high ranges are covered to their summits with stately woods, which afford abundance of good timber. The Bataks are divided into three independent states, and not fewer than 40 petty rajahships are enumerated. The Dutch have obtained access to a portion of their country on the western side, which is comprised in what is called the Tapanooly residency, and the country of Menankabow is also included in their possessions. Ida Pfeiffer is said to have of all European travellers penetrated the furthest into the territory of the Batak.

BATANÆA. See BASHAN.

BATANGAS. **I.** A province in the S. W. part of Luzon, one of the Philippine islands; pop. 247,000. The greater part of its surface is level and very fertile, producing coffee, cotton, cacao, indigo, maize, nutmegs, pepper, &c. A portion of the province is mountainous. Lake Taal in its central part contains an island, in which is the crater of a volcano still active. In the midst of the crater is a small lake, whose waters contain large quantities of sulphuric acid. There are few manufactures. Cattle are raised here and sent to the market of Manila. **II.** A town, the capital of the preceding province, situated on a bay opening into the strait of Mindoro; pop. about 20,000. It was founded in 1581, contains a number of handsome buildings, and has a good trade with Manila.

BATATAS. See POTATO, and YAM.

BATAVI, a tribe of the ancient Chatti, a German nation. At an unknown period they emigrated from the country of the Chatti, north of Bavaria, and settled on an island, afterward called Insula Batavorum, formed by the Rhine,

the Waal (Vahalis), the Maas (Mosa), and the ocean. The Caninefates, another tribe of the Chatti, occupied a portion of the same island in Cæsar's time. The Batavi, who were good horsemen, were employed as cavalry by the Romans in their campaigns on the lower Rhine and in Britain, and also as infantry. In A. D. 69 they rose in arms under their chief Claudius Civilis against the Romans, but though successful for a time, they were ultimately reduced to submission. (See Civilis.) Although included in the Roman empire, they paid no taxes, and were considered rather as allies than subjects. They served as Roman auxiliaries as late as 350.

BATAVIA, a city of Java, capital of the Dutch possessions in the East Indies, in lat. 6° 10′ S., lon. 106° 50′ E., on a swampy plain at the head of a deep bay of the Java sea, on the N. W. coast of the island, upon both banks of the river Jacatra. The bay is protected by a number of islands, and forms a secure harbor. The population in 1832 was 118,300, of whom 2,800 were Europeans, 25,000 Chinese, 80,000 natives, 1,000 Moors and Arabs, and 9,500 slaves; the present number is variously stated at from 70,000 to 150,000, the discrepancy apparently arising from the different areas embraced, the wealthy inhabitants now residing beyond the limit of the fortifications, upon several broad roads running for some distance inland. The local trade and handicrafts are mostly in the hands of the Chinese; the foreign commerce in those of the Dutch, although there are also English, French, German, and American merchants. About 1,500 vessels annually enter the port, two thirds of which are Dutch. The principal

Batavia.

articles of export are spices, rice, coffee, sugar, indigo, tobacco, dyewoods, and gold dust. In 1867 the total value of the exports was $27,227,025; imports, $22,439,435. Batavia was originally laid out on the model of a Dutch city, with broad streets having each a canal in the centre. Under a tropical sun these almost stagnant waters, soaking into the soft soil, produced malaria, and the city came to be regarded as the graveyard of Europeans; the wealthy classes took up their residence in the suburbs which formed the new town on the heights of Weltevreden, whither the government offices were removed. Within a few years canals have been filled up and drainage introduced, so that the city is considered tolerably healthy. The thermometer ranges from 65° to 90°. The old town is mainly inhabited by natives and the poorer Chinese. The city has a bank and a newspaper, and has recently been connected with Singapore by a telegraphic cable 600 m. long. Among the principal public buildings are the Lutheran church, military hospital, and exchange.—Batavia occupies the site of the former native city of Jacatra, which was seized in 1619 by the Dutch governor Jan Pieterszoon Koen, the Dutch having a few years before set up a factory here. The capital of the Dutch possessions in India was now removed from Amboyna to this place. In 1628–'9 the allied sovereigns of Bantam, Jacatra, and Mataram twice besieged the new city, with an army of 100,000 men, but were repulsed. In 1641 there was a revolt of the Chinese population, of whom 12,000 were massacred by order of the governor, Adriaan Valckenaer. In 1811 it was captured by the English, but was restored to the Dutch after the peace.

BATAVIA, a village, capital of Genesee county, N. Y., 30 m. W. S. W. of Rochester, on Tonawanda creek, the New York Central railroad, which here joins the Canandaigua, Batavia, and Tonawanda branch, the Batavia and Attica railroad, and the Buffalo division of the Erie road; pop. in 1870, 3,890. It contains churches of various denominations, 2 banks, and 3 newspaper offices. The state institution for the blind, erected here in 1869, is one of the finest public edifices of the state.

BATAVIAN REPUBLIC, the name given to Holland after its conquest by the French in 1795, and the organization of a republic, May 16, by the French faction in that country. The new republic was obliged to cede to its conquerors some of the southern portions of its territory, included in which were the cities of Maestricht and Venloo, to pay France 100,000,000 florins, and to receive French garrisons into its fortified places. The Batavian constitution was modified in 1801 and 1805, and at length the legislative body, urged by Napoleon, changed the republic into a kingdom, and offered the crown to Louis Bonaparte, who, on June 5, 1806, was proclaimed king of Holland.

BATCHIAN, or **Batjan,** one of the northern group of the Molucca or Spice Islands, in lat. 0° 35′ S., lon. 127° 35′ E., between the islands of Gilolo and Tawali, separated from the latter by a narrow strait; area, 800 sq. m. A low isthmus, on which is the small town of Batchian, connects the N. and S. parts of the island, both of which are mountainous, while the S. portion is volcanic. There are some navigable streams, alluvial plains, and luxuriant palm forests. The clove tree grows wild. The interior of the island is uninhabited, but on the coast there are a few Portuguese, Malays, and Indians driven from neighboring islands. Gold, copper, and coal are found in the north. The Dutch extend their authority over the island, but the government is administered by a native sultan.

BATEMAN, Kate Josephine, an American actress, born in Baltimore, Md., Oct. 7, 1843. At three years of age she made her début upon the stage at Louisville, Ky., as one of the "Babes in the Wood" in a piece of that name; and during the next 10 years, in company with her younger sister Ellen, she acted with great success in many parts of the United States and England. The children developed remarkable talent, and in such juvenile pieces as "The Gay Couple," written specially for them, invariably drew large audiences. In 1856 Kate retired from the stage, but reappeared as a star actress in New York in 1860 in "Evangeline," a drama written by her mother. In December, 1862, she made her first appearance in Boston as Leah, a part peculiarly identified with her, and which she subsequently frequently performed in Great Britain and the United States. In London it was repeated 211 nights in 1863–'4. In October, 1866, she was married to George Crowe, M. D., of London. In 1872 she appeared in London with marked success as Medea in a play of that name.

BATENITES. See Assassins.

BATES, a W. county of Missouri, on the Kansas frontier, watered by the Osage river and its tributaries; area, 1,000 sq. m.; pop. in 1870, 15,960, of whom 120 were colored. The surface is chiefly rolling prairie. The chief productions in 1870 were 104,533 bushels of wheat, 910,266 of Indian corn, 168,621 of oats, 47,118 of potatoes, and 25,350 lbs. of wool. There were 7,331 horses, 1,038 mules and asses, 5,507 milch cows, 11,798 other cattle, 11,294 sheep, and 21,701 swine. Capital, Butler.

BATES, Barnabas, a promoter of cheap postage in the United States, born at Edmonton, England, in 1785, died in Boston, Oct. 11, 1853. He came to America at an early age, became a Baptist preacher in Rhode Island, and was for a time collector of the port of Bristol. In 1825 he established in New York the "Christian Inquirer," a weekly journal. Afterward, while acting as assistant in the post office at New York, he became interested in the question of cheap postage. He investigated the subject for years, wrote, published pamphlets, and lectured, and finally effected a material reduction in the rates of land postage. He was endeavoring to obtain a corresponding reform in ocean postage at his death.

BATES, Edward, LL. D., an American statesman and jurist, born in Goochland co., Va., Sept. 4, 1793, died in St. Louis, Mo., March 25, 1869. He emigrated in 1814 to Missouri with his elder brother Frederick, then secretary of the territory, commenced the practice of law, and became eminent at the bar. He was a leading member of the legislature of Missouri for many years, under the territorial and state governments, as well as of the convention which framed the constitution of the state, and he represented the state in the 20th congress (1827–'9). He was however but little known out of his own state when the internal improvement convention met at Chicago in 1847, before which he delivered an address which gave him a national reputation. Efforts were made to bring him back to political life, but he would neither be a candidate for office in Missouri, nor accept a place offered him in the cabinet of President Fillmore. Mr. Bates was the friend of Henry Clay in 1824, and followed him in supporting the administration and in advocating the reëlection of Mr. Adams. In 1854 he was an opponent of the repeal of the Missouri compromise, and afterward opposed the admission of Kansas under the Lecompton constitution. He presided at the whig national convention at Baltimore in 1856, was strongly supported as a candidate for president in the republican national convention at Chicago in 1860, and was United States attorney general under the administration of President Lincoln, which office he resigned in 1864.

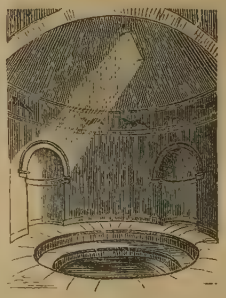
BATES, Joshua, an English banker, born at Weymouth, Mass., in 1788, died in London,

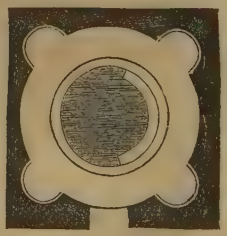
Sept. 24, 1864. At the age of 15 he entered the counting-house of William R. Gray in Boston, and by his remarkable capacity soon attracted the notice of Mr. Gray's father, who sent him to the north of Europe to protect his interests there. In 1826, through the influence of Messrs. Baring Brothers and company, he formed a house in London, in connection with Mr. John Baring, son of Sir Thomas Baring, under the firm of Bates and Baring. On the death of Mr. Holland these gentlemen were both made partners in the house of Baring Brothers and company, of which Mr. Bates remained till his death an active member. In 1854 Mr. Bates was appointed umpire in the English and American commission which had been arranged by the two governments to settle claims held by the citizens of one country against the government of the other. In 1852 he chanced to read the official report of a plan for establishing a free public library in Boston, and wrote immediately to the mayor of Boston offering to contribute $50,000 toward the scheme, on condition that the income of his fund should annually be spent in the purchase of books of permanent value, and that the city should always provide comfortable accommodations for their use, both day and evening, by at least 100 readers. The building was dedicated in 1858, and up to that time he had given to the library between 20,000 and 30,000 volumes over and above all that had been purchased by the resources of his fund. Mr. Bates was married in 1813 to Lucretia Augusta Sturgis, by whom he had one surviving child, Madame Van de Weyer, wife of an eminent diplomatist of Belgium.

BATH, a place or vessel for washing the body. Besides the employment of natural streams and bodies of water, the artificial bath has been used from the earliest times of which we have any record. It is mentioned in Homer, the vessel for bathing being described as of polished marble, like many of the basins which have been found in the Roman baths. Even the warm bath is referred to in the Iliad and Odyssey, but it is spoken of as effeminate. In the historical periods of Greece there were numerous baths in Athens and the other large cities; but we know little of their arrangement, and they appear never to have attained the magnificence afterward reached in Rome. At Rome, in the time of the second Punic war and of the vigor of the republic, the baths, according to Seneca, were dark, small, and inconvenient. It was only with the beginning of the empire that they began to be among the most magnificent buildings of the city, the immense ruins which still exist testifying to the almost unparalleled luxury of their arrangements. The public bath at Pompeii (uncovered in 1824), though inferior in size and appointments to those of the capital, was similar probably to them in its internal arrangements. It occupied an area of about 10,000 sq. ft., and contained two distinct bathing establishments, of which the smaller is believed to have been appropriated exclusively to the women. In the men's baths is first a court, about 60 ft. long, bounded on two sides by a

Plan of Pompeian Bath.

Doric portico, in which those who were waiting their turn for admission to the thermæ might walk or repose upon the benches placed along the wall. From this court there was a communication by means of a corridor with a smaller room, *frigidarium*, in the walls of which holes are observed, which served for the insertion of pegs on which the clothes of the bathers might be hung. This room was the *apodyterium* (the place where the clothes were left) for those who intended to take the *natatio*, or cold bath. From it another door opened into an apartment in which was placed the *natatorium*, or the *piscina*, a basin for the cold bath. The *piscina* itself occupies the centre of the room; it is of white marble, circular, 12 ft. 10 in. in diameter, and a little more than 3 ft. in depth; 10 in. below the lip, and 2 ft. 4 in. from the bottom, it is surrounded by a marble seat, 11 in. in width. The water was conducted into the





Ground Plan.

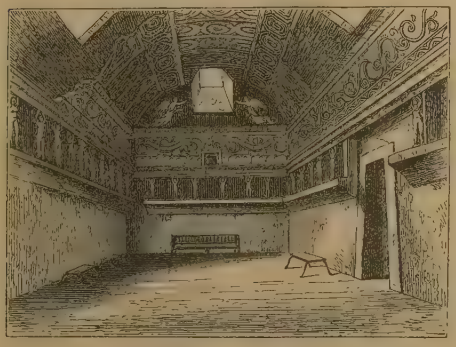
Frigidarium in a Bath at Rome.

basin by a bronze spout, the remains of which can still be discerned in the wall of the chamber. In the bottom was an outlet, by which the water could be let out and the *piscina* cleaned, while the rim is furnished with a waste pipe. From the *frigidarium* a door opened into a similar room, which appears to have been warmed by a large portable fireplace, and was furnished with bronze seats placed along the wall. This

room served as an *apodyterium* for those who were to use the warm baths, and here the bathers, previous to entering the *caldarium*,

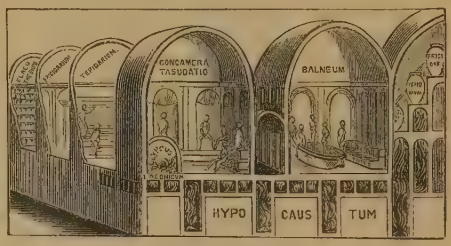
Apodyterium at Pompeii.

were rubbed and anointed with some of the immense number of fragrant oils and ointments which were employed by the ancients. Having left his dress in the *tepidarium*, the bather passed directly into the *caldarium*. The flooring of this apartment, which, in accordance with the directions of Vitruvius, is twice as long as it is broad, is placed upon small pillars (*suspensuræ*), so that the heat from the furnaces had ready and free admission beneath it. The walls, too, were hollow, the inner being connected with the outer wall by strong clamps of iron and brick, and they thus formed one large flue for the circulation of the heated air. At one end of this room was placed the hot



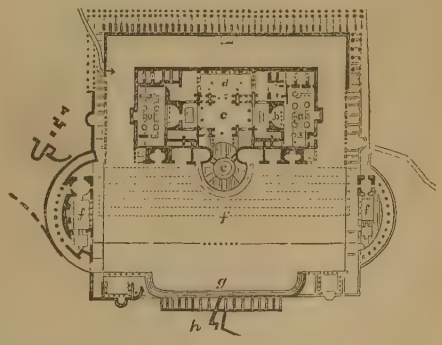
Tepidarium at Pompeii.

bath. This was a shallow cistern (*alveus*), 15 ft. in length by about 4 ft. in breadth, and 2 ft. and half an inch in depth; it was elevated above the level of the floor, and the bathers ascended to it by means of two steps, the top one serving for a seat; on the inside another seat surrounded the whole of the cistern at about half its depth. The hot water was furnished by caldrons placed upon the other side of the wall. At the end of the room, opposite the *alveus*, was the *labrum*, a huge vase or tazza of white marble, 8 ft. in diameter, and having a depth internally of not more than 8 in. From the centre projected a brass tube, probably throwing up cold water. This was perhaps received upon the head of the bather, before he quitted the heated atmosphere of the *caldarium*. Adjoining the *caldarium* was placed the furnace over which was set the caldron for supplying hot water to the baths. The arrangement will be explained by the annexed copy of a fresco discovered in the baths of Titus at Rome. The women's baths resem-



Baths of Titus.

bled those of the men, except that the different apartments were much smaller, and the arrangements less complete.—The great thermæ erected by the emperors at Rome were much more extensive and magnificent structures. The baths of Caracalla were 1,500 ft. long by 1,250 ft. broad. At each end of the building is a large oblong hall, *a*, having on one of its sides a semicircular tribune, *b*. The halls were probably designed for exercise, as was also the large open space *f* before the baths. From the tribunes orators and poets spoke to those assembled at this favorite place of resort. The large central apartment *c* is called the *pinacotheca*, but excellent authorities believe it to have been the *cella calidaria*. The circular apartment *e* was the *laconicum*, or room for the vapor bath; while the apartment *d*, at the other side, was the *cella frigidaria*. The water for all the building came from the elevated reservoir *h*, passing under the rows of seats *g*, from which spectators witnessed the



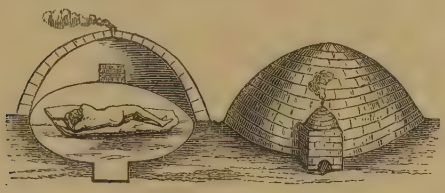
Plan of Baths of Caracalla.

athletic exercises below. All the apartments of the bath were magnificently ornamented with mosaic, and profusely adorned with

painting, stucco work, and statuary. In these immense establishments, the apartments were not only more numerous, but some of them on a very much larger scale. Thus the *natatorium*, or swimming bath, in the baths of Diocletian, was 200 ft. long by 100 ft. broad, and it is calculated that in the whole establishment more than 18,000 persons could bathe at the same time.—In the times of the republic the cold bath alone was ordinarily employed, but later the hot air and warm bath were likewise generally used. The order in which they were taken varied according to the directions of the physicians or the inclination of the bather. Previous to bathing, gentle exercise was generally taken; then it was recommended that the bather should remain in the *tepidarium*, or warm chamber, for a time previous to undressing; after undressing he proceeded commonly to the *caldarium*, and after sweating some time in its heated atmosphere, he either gradually immersed himself in the hot water bath, or had hot water simply poured over the head and shoulders; then cold water was poured over the head, or the bather plunged into the cold *piscina*. He was now scraped with *strigiles* (small curved instruments, made generally of bronze), dried and rubbed with linen cloths, and finally anointed. When one bath alone was desired, it was taken just before the principal meal; but the Romans bathed after as well as previous to their *cœna*, and Commodus is said to have indulged in seven or eight baths a day.—The Turks and Arabs have, since the decline of Roman civilization, more particularly cherished the custom of bathing than any other nations. The laws of Mohammed ordain five prayers daily, and an ablution of the face, hands, and feet before each of them. There are many other occasions for bathing, and the public bath is as sure to be found in every village as the mosque. With these eastern nations, as well as in Egypt, public bathing is a very complicated art. The bather, having left his dress in the reception room, proceeds through a long gradually warmed passage into the spacious bathing room, in which the steam of boiling water and the perfumes of burning essences are combined. He there reclines upon a kind of hammock, and when he has perspired sufficiently, the process of shampooing and bending the joints is performed upon him. He then passes into an adjoining apartment, where his head is profusely covered with the foam of soap, and his body with a kind of pomatum. In two other rooms he is washed with both warm and cold water, and he returns to the open air as he entered, through a long passage the temperature of which is graduated.—In India, also, there are public baths, which are associated with the practice of shampooing. The bather is extended upon a plank, and a vigorous attendant pours hot water over him, presses and bends the various parts of the body, cracks all the joints, and continues this operation of pouring, pulling, and pressing for about half an hour. He then rubs him briskly with a hair brush, with soap and perfumes, after which the subject is obliged by his fatigue to sleep a few hours, but wakes extremely refreshed. The women in India take a lively pleasure in being shampooed by their slaves, and Europeans who enter upon the process with a sort of fear describe the sensation which results as delightful and peculiar.—The northern nations have also their peculiar usages in respect to bathing. The Russian lord has his bathing room in his own house, and the people in the villages frequent the public bath at a small expense. The entire operation consists, first, of a perspiration, then of friction, and of successive ablutions in hot and cold water. The poorer people, however, adopt a simpler method. They remain in the bathing room only till they begin to perspire freely, and then rush out and throw themselves, perhaps through a crust of ice, into the nearest stream or pond, thus exposing themselves suddenly to the extremes of temperature, and tempering themselves as steel is tempered. Among the Russians of Siberia, the bath is especially in use as a means of driving off the effects of a violent cold and preventing fever. The subject is taken into the bath room and placed upon a shelf within an inch or two of a steaming furnace. After he is well parboiled in this position, he is drubbed and flogged for about half an hour with a bundle of birch twigs, leaf and all. A pailful of cold water is then dashed over him from head to foot, the effect of which is described as electrifying. He is next put in an exhausted condition to bed, and physic is administered. It is rare that a fever does not beat a retreat after a few repetitions of the bath and the physic.

Turkish Bath.

Bayard Taylor, in his winter travels in Lapland, gives an account of similar baths. There the bather is placed on an elevated platform, and vapor is produced by throwing water on heated stones beneath.—In Mexico, a peculiar form of vapor or steam bath is in use. The steam, generated below the floor of a



Mexican Steam Bath.

small apartment, is admitted around the bather, who reclines on a low bench.—The Japanese are constant frequenters of the bath, though bathing is with them a simple process. A large tank or pond occupies the centre of their bath house, and men and women bathe toge-

Japanese Bath.

ther. The warm bath, in its more elaborate forms, is seldom found in Japan.—The use of the bath has not marked the manners of the most civilized modern nations, as it did those of the polite nations of antiquity. Yet it is less neglected now than formerly, and public baths, though they are not centres of resort for the people, are found in all large cities, and private baths are common in dwelling houses. Turkish baths, with some peculiarities adopted from the baths of other eastern nations, have also become popular of late years in western Europe and America, and are now to be found in almost every large city; and Russian baths are also numerous.—*Hygiene of Bathing.* To bathe, in the widest sense of the word, is to surround the body, or a portion of it, for a temporary period, by a medium different from that in which it usually exists. The medium may consist of air or vapor, of water, either pure or holding various substances in solution, or finally even of sand or mud. The body may be wholly or partially immersed in the medium, as in the ordinary plunge bath, the foot bath, hip bath, &c.; or the medium may be poured with greater or less force upon the body, as in the shower and douche bath. The temperature of the medium, as it is warm, hot, or cold, modifies powerfully the effect of the bath. In the present article we shall confine our attention to the effects of the ordinary water bath, and of the hot air and vapor baths. The temperature at which the water bath may be taken varies from 32° to 112° or even 120° F., and baths are ordinarily divided into cold, warm, and hot, according to the sensation they communicate to the bather. These sensations, it must be recollected, are no very accurate measure of the true temperature; the water which to one person seems warm, to another feeling cool. Systematic writers have further multiplied these divisions; perhaps the most convenient among them is that proposed by Dr. John Forbes. He divides the water baths into the cold bath, from 32° to 60° F.; the cool, 60° to 75°; the temperate, 75° to 85°; the tepid, 85° to 92°; the warm, 92° to 98°; the hot, 98° to 112°. On plunging into cold water the bather experiences a shock attended with a sensation of cold that may amount to rigor, and with a sudden catching of the breath, caused by the contact of the cold fluid with the surface of the face and trunk; in some persons this spasmodic anhelation is so great as entirely to prevent speech. The surface appears contracted and shrunken, the superficial veins become smaller or disappear, the color assumes a bluish tint. After a short time, the duration of which depends partly upon the coldness of the water, partly upon the constitutional vigor of the bather, reaction takes place; the chilliness and rigor disappear, and are succeeded by a sensation of warmth, which diffuses itself over the whole surface; the respiration becomes tranquil, and there is a general feeling of lightness and vigor. After a variable period the bather again begins to suffer from the cold, trembling and rigor supervene, the movements become impaired and feeble, the pulse is smaller and less frequent, the breathing is oppressed, and the whole body is languid and powerless. If he leave the water before the occurrence of the second period of chill, there is a renewal of the reaction, a glow pervades the surface, the color returns and is heightened, the pulse is fuller and stronger than before the immersion, and there is a general feeling of buoyancy and vigor. M. Begin, experimenting upon the cold bath, took nine baths in the Moselle under the ramparts of Metz, toward the end of October, the thermometer in the open air standing at from 2° to 6° Réaumur (36½ to 45½ F.). At the moment of immersion there was a sensation as if the

blood were all driven to the interior of the body, particularly to the chest; the breath was gasping, interrupted, quickened, almost to suffocation; the pulse concentrated, small, and hard; there was rigidity of the tissues, but without trembling. At the end of two or three minutes a feeling of calm followed, the respiration became deep, the skin warm, and all the movements were free and easy. "All the muscular movements are quick, easy, and precise; one feels as if the skin and aponeuroses were applied more closely to the muscles, and that these thus held down acted with greater force and energy than in their ordinary state. Soon a lively redness covers the surface, a marked and pleasant feeling of warmth spreads over the skin; it seems as if one swam in a liquid raised to 86° or 98°; the body appears to seek to expand in order to multiply the surface of contact; the pulse is large, full, strong, regular. Few sensations are so delicious as those felt at such a moment. All the springs of the animal machine acquire greater flexibility, strength, and firmness than they had previously; the limbs cleave with ease a fluid which no longer offers any resistance; one moves without effort, with quickness, and above all with an incredible lightness." In from 15 to 20 minutes there was a gradual return of cold and discomfort; it was then time to leave the water. If the bather still remained, he was seized with chills, and the difficulty of moving became so great that he was in danger of drowning. On quitting the water, continues M. Begin, before the reaction has ceased, the transition to the cold air gives no unpleasant sensation. In despite of the wind and the moisture which covers the body, the latter remains warm, and the skin is so insensible that the friction of the towel is not perceived; indeed, M. Begin sometimes rubbed off the cuticle without being aware of it. To endure a bath of such a temperature with safety, to say nothing of enjoyment and benefit, requires a vigorous constitution and great promptness of reaction. M. Rostan, another French physician, was unable to remain longer than six minutes in the Seine at a time when the water was 43° F., and then reaction only fully occurred on the following night after many hours of discomfort, accompanied by a painful feeling of weight about the head. Reaction takes place most promptly, and a lower temperature can safely be borne, when exercise is conjoined with bathing, as in swimming, than when the body is at rest. Salt water is more stimulating than fresh, and renders the reaction more marked and of longer duration; the shock of the waves too, by rendering muscular action necessary to resist it, has a similar influence. The effects of the cold bath, where it agrees, are tonic and bracing; it stimulates the skin, improves the appetite, and renders the circulation more active and vigorous. It hardens the system, and causes it to be much less sensitive to vicissitudes of temperature. The regular employment of the cold bath is the best protective against the liability to take cold on moderate exposure. Its beneficial effects depend mainly on the promptness and completeness of the stage of reaction; if full reaction does not take place, if the bather remains cold and shivering, with a sense of weight about the head, the bath is injurious. It should not be taken when the body is fatigued and exhausted, or when it is overheated by exertion in hot weather; on the other hand, a moderate degree of warmth, or even a gentle perspiration, provided there is no exhaustion, does not contra-indicate its employment. When first employed, it should be used but a few minutes until the bather has tested his powers of resistance and reaction, and the interval can then be gradually increased. When the shower or cold bath is taken in the house, it may be used immediately on rising while the body is still warm from bed; but the sea bath suits best about noon, or some three hours after the morning meal. The presence of disease of the heart or of the great blood vessels renders the use of the cold bath dangerous. The cool and temperate baths produce effects similar in kind to those of the cold bath, but less in degree; they are the cold bath of the invalid and feeble. Infants and old persons, as a rule, bear the cold bath badly. Young infants in particular do not react promptly, but remain cold and blue for some time after taking a bath; yet in feeble and strumous children the bath is one of our best means of hardening and invigorating the constitution. With them it is best to commence with the tepid bath, and the temperature should gradually, day by day, be lowered; when the cold bath is arrived at, it should be given in a properly warmed apartment; the immersion should be sudden, complete, and continued but for a few moments, and the child should immediately afterward be well and thoroughly rubbed with dry flannels.—The effect of the warm bath is very different from that of the cold bath. There is no shock; on the contrary, the temperature is grateful to the bather. The blood is solicited to the surface, which becomes full and rounded. The cuticle absorbs water and is softened, and the epithelial débris are readily removed. The pulse is unaffected, irritability of the nervous system is soothed, pain dependent on spasmodic action or neuralgia is allayed, and the relaxation of the skin extends to the deeper-seated parts. Its beneficial effects are especially recognizable after excessive muscular exercise or after the fatigue and excitement of a long journey, in refreshing and tranquillizing the system. On the other hand, the warm bath exercises none of the tonic and astringent influence which is produced by the cold; its frequent use tends to relax and debilitate, while it renders the system more sensible to the variations of external temperature.—The hot bath, 98° to 112° F., produces at first an inconvenient and even painful sensation of heat; from the determination of blood to the surface, it soon becomes reddened

and swollen, the face is turgid, the eyes are injected; the action of the heart is increased, the pulse becomes fuller and more frequent, the carotid arteries in particular beat with violence; the breathing is oppressed, and there is a painful sensation of weight about the head; soon the parts not covered by the water break out into a profuse perspiration, which only partially relieves the discomfort of the patient. On leaving the bath the excitement does not immediately subside; the pulse continues to beat with force and frequency, the extremities, particularly the lower, remain swollen, and the patient perspires abundantly, while the secretion of urine is diminished; there is a sense of muscular fatigue, and the whole system is relaxed and weakened. These symptoms, however, when present, are to be attributed to a too sudden or too long continued action of the hot bath. The best mode of obtaining its beneficial effects, in ordinary cases, is to begin with water at the temperature of the tepid bath, and gradually raise it to that of the hot bath. When the full effect of this is produced, and before any signs of exhaustion manifest themselves, the bather should leave the hot water and take a momentary shower or douche of cold water, to be followed immediately by rubbing with the towel. In healthy persons this will usually produce a moderate and agreeable reaction. The continued warm or hot bath, however, is sometimes employed intentionally to produce temporary muscular relaxation in cases of dislocation or strangulated hernia.—Besides the cold and warm water bath, the body may be exposed to the action of air artificially heated or to the vapor of boiling water. The former, the *laconicum*, was habitually employed by the Romans and is now used by the Turks and the Egyptians, and the latter by the Russians. The effects of both, when the temperature is much elevated, are at first highly stimulating. The beat of the heart is increased in force and frequency; the pulse rises to 90, 100, 120, and even 150 or 160 beats in a minute; the blood is driven powerfully to the surface, the face becomes flushed, the eyes injected and suffused, the skin turgid, and the bather soon breaks out into a profuse sweat; if the temperature is very high and too long continued, after a time the whole mass of the blood becomes heated above its normal standard, and this may be attended with dangerous or fatal consequences. Owing to the free evaporation from the surface, the hot-air bath can be borne of a much higher temperature than the vapor bath. The ordinary heat of the Russian or oriental bagnio is from 120° to 140° F., though it is occasionally raised as high as 180° or 190°; while, when the air is moderately dry, a temperature of from 250° to 280° F. has been borne for some time with impunity. Medicated baths are used in the treatment of diseases, generally those of a chronic character, and may be either liquid or vapor baths, the vehicle being water, watery vapor, or air.

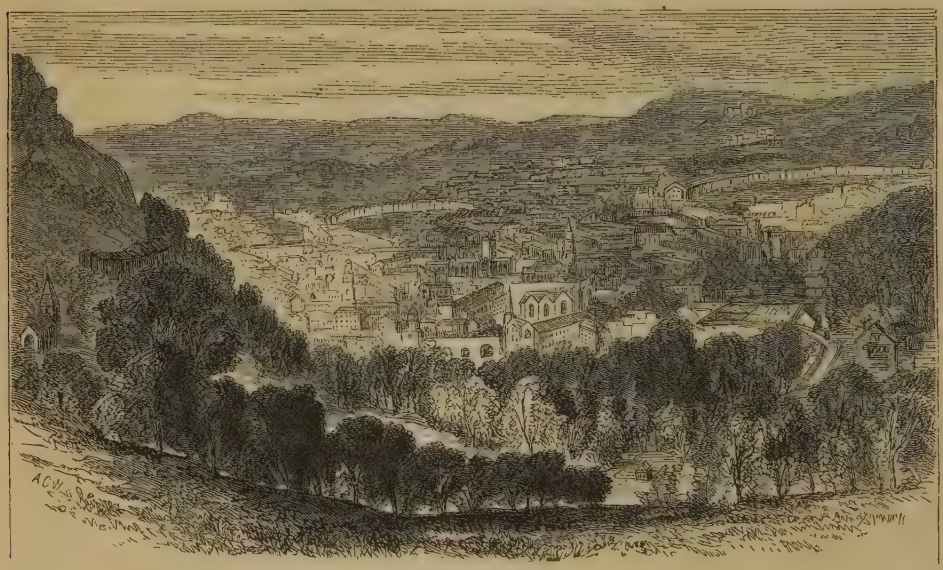
BATH. **I.** A W. county of Virginia, lying among the Alleghanies and bordering on West Virginia; area, 725 sq. m.; pop. in 1870, 3,795, of whom 889 were colored. The surface is hilly, and well watered by the sources of the James, Cowpasture, and Jackson rivers. The soil is very fertile in the valleys. There are many medicinal springs. The Chesapeake and Ohio railroad traverses the county. The chief productions in 1870 were 30,093 bushels of wheat, 49,252 of Indian corn, 23,552 of oats, and 2,790 tons of hay. There were 1,081 horses, 1,357 milch cows, 3,534 other cattle, 3,029 sheep, and 2,380 swine. Capital, Warren Springs. **II.** A N. E. county of Kentucky, watered by Licking river and Slate creek; area, 290 sq. m.; pop. in 1870, 10,125, of whom 1,702 were colored. The N. W. portion is remarkably fertile. Coal and iron are found in great abundance, and there are numerous medicinal springs. The chief productions in 1870 were 46,113 bushels of wheat, 23,092 of rye, 860,631 of Indian corn, 108,945 of oats, 2,175 tons of hay, and 25,480 lbs. of wool. There were 4,178 horses, 2,199 mules and asses, 2,879 milch cows, 7,209 other cattle, 8,343 sheep, and 22,405 swine. Capital, Owingsville.

BATH, a city, port of entry, and the capital of Sagadahock co., Maine, situated on the W. bank of the Kennebec river, 4 m. below its junction with the Androscoggin at Merrymeeting bay, 12 m. from the ocean, and 35 m. by rail S. of Augusta; pop. in 1860, 8,076; in 1870, 7,371. The river here is a mile wide, with abundant anchorage and docks, the tide rising about 12 ft. The city extends 2½ m. along the bank, and 1 m. back. It is irregularly laid out, contains 5 national banks, 2 savings banks, 2 Congregational churches, 1 Baptist, 2 Freewill Baptist, 2 Methodist, 1 Universalist, 1 Episcopal, 1 Roman Catholic, and 1 Swedenborgian. There are 19 public schools, attended by 1,795 pupils. The valuation of property in 1860 was $5,876,993, and in 1870, $6,393,876. One daily and one weekly newspaper are published. The principal business is ship building, in which Bath ranks next after New York, Philadelphia, and Baltimore. During the year ending June 30, 1871, there were built here 48 vessels, of 9,825 tons. A large number of vessels engaged in commerce in all parts of the world are owned in Bath. The number of vessels registered, enrolled, and licensed in 1871 was 195, with an aggregate tonnage of 81,951. As the river never freezes here and is of great depth, Bath has great advantages as a commercial port. During the year ending June 30, 1871, the imports amounted to $182,512, and the exports to $24,985; 4 American vessels of 2,691 and 27 foreign vessels of 1,864 tons entered from foreign ports; the clearances for foreign ports were 12 American vessels, tonnage 4,777, and 27 foreign vessels, tonnage 2,435. The entrances in the coastwise trade were 70, with an aggregate tonnage of 42,232, and the clearances 52, of

17,018 tons. There were 32 vessels of 681 tons engaged in the cod and mackerel fishery. The custom house is a granite edifice built at a cost of about $50,000. A branch of the Maine Central railroad connects the city with Brunswick, 9 m. distant; and there is steamboat communication with Boston and Portland. Bath was incorporated as a town in 1780, and as a city in 1850.

BATH, a township and village, capital of Steuben co., N. Y., on Conhocton creek, 20 m. N. W. of Corning; pop. of the township in 1870, 6,236. The village has several churches, a bank, two weekly newspapers, and some mills and factories. The Buffalo division of the Erie railway passes through the village.

BATH (anc. *Aquæ Solis*), a city of Somersetshire, England, 106 m. W. of London by the Great Western railway, on the river Avon, 12 m. above Bristol; pop. in 1871, 52,542. Built chiefly of freestone and upon the sides of high hills, the city rises in a succession of terraces, circuses, and gardens. It is a place of resort for invalids on account of the hot springs from which the city derives its name, and which are beneficial in palsy, rheumatism, gout, and scrofulous and cutaneous affections. Their character is alkaline sulphureous, with a slight proportion of iron. There are three springs of a constant temperature of 109°, 114°, and 117° F. The last named yields 128 gallons a minute. Bath was formerly a place of great fashion and gayety. In the last century and the beginning of the present it was at the height of its celebrity, but the opening of the continent after the war diverted the stream of visitors toward the German spas. The city is one of the most ancient in Britain, and was reputed to have



Bath, England.

been founded before the Roman invasion. It was a station on the old Roman road leading from London to Wales. There have been found at and near the site of the present town Roman coins, vases, altars, baths, and the remains of a Corinthian temple. Joined with the city of Wells, it is a bishop's see. The city has an abbey church, a relic of an ancient monastery. There are well supported hospitals for general purposes, and for the uses of those poor who resort to the city for the sake of the baths. Bath has been the residence of several men of political distinction, in particular of Pitt and Sheridan. William Beckford, the author of "Vathek," resided and died in Bath.

BATH, Earl of. See PULTENEY, WILLIAM.

BATH, Knights of the, a military order in Great Britain. This order is supposed to have originated at the time of the first crusade, but first distinctly mentioned in the reign of Henry IV. Froissart says that, at the coronation of that king in the tower of London in 1399, 46 esquires were made knights, and were called knights of the bath, because they had watched and bathed during the night preceding, and that they wore on the occasion long coats trimmed with white fur, and had white laces hung about their shoulders. From that time it was usual for English kings to create knights of the bath at the coronation of themselves or their queens, the birth or marriage of princes or princesses, on the eve of starting upon foreign military expeditions, and after gaining a battle or taking a town. At the coronation of Charles II. 68 knights of the bath were made, but the order was then neglected and discontinued, till in 1725 George I. revived it by letters patent. He gave a book of statutes for its government,

by which it was decreed that the order should consist of the sovereign, a grand master, and 36 companions. Its badge, of pure gold, was to be a sceptre of three united imperial crowns, from which grew the rose, the thistle, and the shamrock, and around which was inscribed the ancient motto, *Tria juncta in uno*. It was to be hung by a red ribbon from the collar obliquely over the right shoulder. The collar should contain 30 ounces troy weight of gold, and be a complicated arrangement of nine crowns and eight roses, thistles, and shamrocks, the latter being enamelled in their proper colors and attached to the crowns by gold knots enamelled white. A silver star also, made to resemble the badge, and with a glory or rays proceeding from its centre, should adorn the left shoulder of the knight, being embroidered upon the left side of his mantle. The apparel of a knight of the bath was ordered to be a red surcoat, lined and edged with white and encircled by a white girdle, a crimson mantle lined with white and fastened about the neck with a cordon of white silk, a white silk hat surmounted by plumes of white feathers, white boots, red stockings and breeches, and a sword in a white leather scabbard. In 1815 the number of the knights of the bath was enlarged. Three denominations and ranks were then ordained in the order: the first, consisting of knights grand crosses, to be conferred only upon officers who had reached the rank of major general in the army or rear admiral in the navy, excepting that 12 of the number might be appointed for eminent civil services. The grand crosses were distinguished by wearing over their badge and star a wreath of laurel winding about an escrol, on which was inscribed *Ich dien*. The second class, consisting of knights commanders, take precedence of all knights bachelors in the kingdom, and no one is eligible to this dignity till he has reached the rank of major general in the army or rear admiral in the navy, and no one is eligible as a grand cross till he has first been a commander. The third class, consisting of knights companions, takes precedence of all esquires in the kingdom, and no officer is admissible to this dignity who has not received a medal in reward for valor, or been especially mentioned as of signal merit in the despatches of his superior officer.

BÁTHORI, or **Báthory,** the name of a noble Transylvanian family, several members of which have played a distinguished part in history. **I. Stephen** (István), of the Ecsed branch of the family, a commander under King Matthias Corvinus, achieved a great victory over the Turks at Kenyérmezö in 1479. **II. Stephen,** of the Somtyó branch, was waywode of Transylvania under John Zápolya. **III. Stephen,** son of the preceding, born in 1532, was elected prince of Transylvania in 1571. He was afterward elected king of Poland, and crowned at Cracow in 1576. On this event he resigned his rule over Transylvania, at the same time recommending his brother to the house of deputies as his successor. He died after a prosperous reign, in 1586. (See Poland.) **IV. Christopher** (Kristóf), elder brother of the preceding, elected prince in his stead in 1576. The Jesuits came to Transylvania during his reign, and the education of his son was committed to their charge. He died in 1581. **V. Sigismund** (Zsigmond), son of the preceding, chosen prince before the death of his father. He was a weak-minded man, and, having married a princess of the house of Hapsburg, made an agreement with the emperor Rudolph II. that, if he should die without issue, the rule of Transylvania should be transferred to the emperor or to his successor; a compact which he, as merely an elected prince, had no right to make. He was afterward persuaded by the Jesuit Simon Genga to make over his principality to Rudolph, on the promise of being made bishop and cardinal. Notwithstanding some violent opposition on the part of the deputies, one of whom was put to death, this transfer was effected in 1598, and Báthori retired into Silesia. But, after waiting several months in vain expectation of the promised bishopric and cardinal's hat, he returned to Transylvania, reassumed the princely office, and immediately transferred the same to his uncle Andrew. He then retired into Poland, but on the death of his brother returned, and again assumed the government of Translyvania (1599). He was soon, however, compelled by the emperor to resign for the third time, and, having received from him a pension and an estate, finally died at Prague, March 27, 1613. **VI. Gabriel** (Gábor), a cousin of the preceding, became prince of Transylvania in 1608, was capricious and cruel, and, succumbing to a revolt, fled to Gross-Wardein, where he was killed by some malcontents in 1613. **VII. Elizabeth** (Erzsébet), the wife of a Hungarian count, notorious and execrated for her remorseless cruelty. Believing that the blood of young maidens would restore freshness and bloom to her shrivelled skin, she caused a great many to be brought to her castle on various pretences, and then, to obtain the desired bath, had them bled to death by some accomplices. Her horrible practices were at last discovered, and she was brought to trial. One of her accomplices, a man, was decapitated, two females, the chief instruments of her crimes, were burned alive, and the countess herself was condemned to imprisonment for life (1611). She died in confinement a few years later.

BATHURST, a town of New Brunswick, capital of Gloucester county, situated on the most southern point of the bay of Chaleurs, 237 m. N. W. of Halifax; pop. about 2,000. It is a port of entry, and has considerable trade. It has a good harbor, and is noted for its ship building.

BATHURST. I. An E. county of New South Wales, Australia, bounded N. E. by the Mac-

quarie, and S. W. by the Lachlan; area, about 2,000 sq. m.; pop. in 1871, 16,826. It was the earliest district settled on the W. side of the Blue mountains, through which a practicable route was first discovered in 1813. It is an excellent grazing country, well watered, and, being nearly 2,000 feet above the level of the sea, has a moderate climate. The first discovery of gold in Australia was made in this county, Feb. 12, 1851, by Edmund Hargraves, an Englishman who had been a miner in California. **II.** The principal town of the preceding county, situated near the centre of the gold region of the district, on the river Macquarie, 98 m. W. N. W. of Sydney; pop. about 5,000. Two lofty elevations lie near the town, Mount Rankin, about 4 m. to the N. W., and the Bald Hill, 2 m. to the S. W. The town was founded by Gov. Macquarie in 1815, and named in honor of Lord Bathurst, the then English secretary of state for the colonies. It is now the finest of all the inland towns of the colony, and is built on a sloping plain intersected by a deep watercourse, over which there are several bridges. The streets are broad, and cross each other at right angles. Many of the stores are large, well built, and well supplied with goods. The Episcopalian, Roman Catholic, Presbyterian, and Methodist churches are large and handsome, and there are many public and private schools, and an extensive school of arts. There are several good hotels, a theatre, and a large and well managed hospital. Bathurst was erected into a municipality Nov. 13, 1862, and is the seat of a Roman Catholic and an Anglican bishop. In 1872 two bi-weekly newspapers were published here.

BATHURST, a settlement on the isle of St. Mary, near the mouth of the Gambia, on the W. coast of Africa, founded by the English in 1816, and the principal of the English establishments in Senegambia. It is situated only 12 or 14 feet above high-water mark, and is not a healthy station, water being scarce and not of good quality. The island has about 3,000 inhabitants, few of whom are Europeans.

BATHURST, an old English family, prominent in the last three centuries. **I. Ralph,** dean of Wells, born at Howthorpe in Northamptonshire in 1620, died June 14, 1704. He was educated at Trinity college, Oxford, of which college his grandfather, Dr. Kettel, was president. He took his degrees of bachelor and master of arts in 1638 and 1641, studied theology, and was ordained in 1644. He delivered some theological lectures in 1649, which he soon afterward published, and which gained him much reputation. But the troubles of the period made him resolve to abandon the clerical profession, and he began to study medicine, and took a doctor's degree in 1654. He had a large practice, and was made physician to the navy. In conjunction with Dr. Willis, who like himself had abandoned the church for the medical profession, he settled at Oxford, where he studied chemistry and several branches of natural philosophy. He took an active part in the foundation of the royal society, and in 1663 was elected a fellow of the Oxford branch of the society. After the restoration he abandoned physic and returned to the church, was made chaplain to the king in 1663, dean of Wells in 1670, and in 1691 was nominated to the bishopric of Bristol, which he declined. In the latter part of his life he was president of Trinity college and vice chancellor at the university. He wrote good Latin poetry. **II. Allen,** first Earl Bathurst, born in London in November, 1684, died Sept. 16, 1775. He was the eldest son of Sir Benjamin Bathurst, treasurer of the household to Queen Anne before she ascended the throne. He entered parliament in 1705, and was called to the house of lords as Baron Bathurst in 1711, in 1757 was made treasurer to the prince of Wales, and on the accession of this prince as George III. soon after, declined further public employments, but accepted a pension of £2,000 a year. In 1772 he was created Earl Bathurst, and spent the rest of his life in retirement. He was a political opponent of the duke of Marlborough and of Sir Robert Walpole, and was on intimate terms with Pope, Gay, Addison, and Congreve. **III. Henry,** the only surviving son of the preceding, born May 2, 1714, died Aug. 6, 1794. He was made chief justice of the common pleas in 1754, and lord chancellor in 1771, with the title of Baron Apsley, and resigned the seals in 1778, having voted against the Chatham annuity bill, a ministerial measure. He was president of the council in 1780, and in the Gordon riots was assaulted by the mob. **IV. Henry,** bishop of Norwich, cousin of the second Earl Bathurst, born Oct. 16, 1744, died April 5, 1837. He was educated at Winchester and New college, Oxford, obtained a rectory in Norfolk, and then the rich family living of Cirencester, with the deanery of Durham, and a canonry of Christ church, Oxford. In 1805 he was made bishop of Norwich. In parliament he strongly advocated Roman Catholic emancipation, concessions to the dissenters, and parliamentary reform. His life was written by his eldest son, Dr. Henry Bathurst. **V. Henry,** second Earl Bathurst, son of Baron Apsley, born May 22, 1762, died July 27, 1834. He entered the house of commons, and was successively lord commissioner of the admiralty, commissioner for India, foreign secretary, and colonial secretary. When the tories came into power in 1828 he became president of the council, but resigned in 1830. He was afterward first lord of the admiralty.

BATHURST INLET, an arm of the Arctic ocean, projecting due S. about 75 m. out of Coronation gulf, lat. 68° N., lon. 111° W. It is in a direct line between the magnetic pole and Great Slave lake, and about 300 m. from each.

BATHYÁNYI. See BATTHYÁNYI.

BATHYBIUS, the name given by Prof. Huxley to a very low form of the protozoa, found penetrating in every direction the viscid calca-

reous mud brought up in sea dredgings, by Drs. W. B. Carpenter and Wyville Thompson, from a depth of about 650 fathoms in the north Atlantic ocean. According to Huxley, a very large extent of the bed of the Atlantic ocean is covered by this living expanse of transparent gelatinous or protoplasmic matter, growing at the expense of inorganic elements, in which are imbedded granular bodies which he calls coccoliths and coccospheres, and to which they bear the same relation as the spicules of sponges do to the soft parts of these animals. This mud also contains minute foraminifera, the so-called *globegerinæ* whose calcareous remains are forming a stratum at the bottom of the ocean, considered by Huxley the same in character and mode of formation as the chalk of the cretaceous period. Dr. Wallich, on the contrary, regards the so-called bathybius, not as an animal, but as a complex mass of slime, with many foreign bodies and the remains of once living organisms in it, and also with numerous living forms. Denying the organic nature of bathybius, he maintains that the coccoliths and coccospheres stand in no direct relation to it, but are independent structures derived from preëxisting similar forms, and that their nutrition is effected by a vital act which enables these organisms to extract from the surrounding medium the elements necessary for their growth. Dr. C. W. Gumbel has recently (1872) published a paper confirming the conclusions of Huxley, Carpenter, and Häckel with regard to the organic nature of the protoplasmic bathybius and the coccoliths (discoliths and cyatholiths), and their relationship to each other. A similar growth in fresh water has been called *pelobius*.

BATHYLLUS OF ALEXANDRIA, a freedman and favorite of Mæcénas, who, together with Pylades of Cilicia, was preëminent in the imitative dances called *pantomimi*. In the reign of Augustus, with Bathyllus and Pylades as principal performers, pantomimes were brought to their highest point of perfection, but they afterward grew more and more obscene and demoralized. Bathyllus excelled in the representation of comic characters, and Pylades in tragic personifications. Each had his school and disciples, and each was the head of a party.

BATOKA, a tribe of S. Africa, who occupy two considerable islands in the river Leeambye, and the adjacent country on either bank. They formerly held wide sway, but are now for the most part subject to the Barotse. The Batoka universally knock out the upper front teeth of both sexes at the age of puberty. They are very degraded, and addicted to smoking the mutokwane (*cannabis sativa*), from the effects of which they become delirious.

BATONI, Pompeo Girolamo, an Italian painter, born at Lucca in 1708, died in Rome, Feb. 4, 1787. Some of his best works are at Lisbon and St. Petersburg. His principal picture at Rome is the "Fall of Simon Magus," at the church of Santa Maria degli Angeli.

BATON ROUGE, a city, capital of the parish of East Baton Rouge, La., and formerly of the state, situated on a bluff on the E. bank of the Mississippi, 129 m. above New Orleans; pop. in 1870, 6,498, of whom 3,356 were colored. It was one of the first French settlements, said to have been the site of an old Indian village. It is in the midst of a large district devoted to the cultivation of sugar and cotton. The town is well built, contains a national arsenal and barracks, a military hospital, and the state penitentiary and deaf and dumb asylum. It is the seat of the Louisiana state university, which in 1871 had 18 instructors, 184 students, and a library of 7,000 volumes, and of Baton Rouge college. It has one weekly and two daily newspapers and a monthly periodical. In the civil war Baton Rouge was occupied by federal troops shortly after the capture of New Orleans. On Aug. 5, 1862, Gen. Williams was attacked there by the confederate Gen. Breckenridge, and fell, gallantly fighting, at the moment of victory; the ram Arkansas, on the cooperation of which the assailants had counted, having broken her engine and proved a failure.

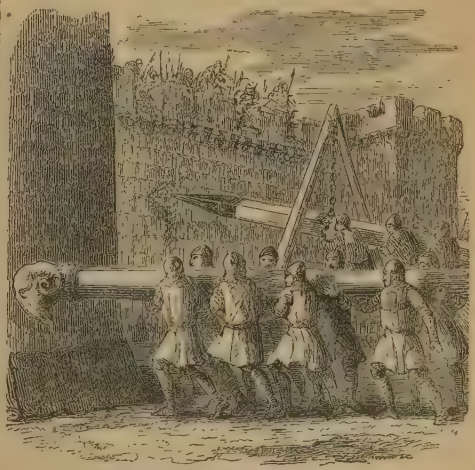
BATON ROUGE, East and West. See East Baton Rouge, and West Baton Rouge.

BATRACHIANS. See Amphibia.

BATSHIAN. See Batchian.

BATTA. See Batak.

BATTERING RAM (Lat. *aries*), the earliest machine for destroying stone walls and the ordinary defences of fortified towns. The primitive form of this instrument was a huge beam of seasoned and tough wood, hoisted on the shoulders of men, who ran with it at speed against the obstacle. The second step was strengthening and weighting the impinging end of the machine with a mass of bronze, brass,



Battering Rams.

or iron. The third improvement was suspending it by chains or ropes from a crane or trivet, in such a manner as to allow it to swing some

30 or 40 feet to and fro, under the impulse of human force, as nearly as possible on the plane of the horizon. When the impetus was once given to this vast beam of wood, 100 or 150 feet in length, all that was requisite was to impart to it such continued motive force as to keep it in play, when its own impetus would of course gradually increase; and it would necessarily act with the force of its own natural weight, multiplied by a constantly increasing measure of velocity, upon the object on which it impinged. To this must be added that the ram being, in its most highly improved state, played in exact time, it acquired a perfect vibratory motion itself; and its blows being directed continually on one spot, at regular intervals, a similar vibration was communicated to the wall; which, increasing with the increased weight of the blows, a second wave being always put in circulation from the centre of the attack before the preceding wave had subsided, soon set the whole mass of masonry surging and swaying backward and forward. The objections to it were, that it could only be used at close quarters, where direct access could be had to the foot of the fortification which was to be beaten down, by bodies of men, who necessarily worked for the most part in full view, and exposed to the missiles of the defenders at an exceedingly short range. The former of these requirements rendered it necessary to fill up or bridge over the moats or ditches in front of the work. The latter led to the construction of towers of planking, covered with raw hides, of many stories in height, rolling on wheels; in the lower stage of which the ram was slung so that the men who worked it could do so perfectly under cover, while the upper stages were filled with archers and slingers, whose duty it was to operpower the fire of the defenders. From the top of these machines a sort of bridge was also contrived, which could be lowered and hauled out with chains and pulleys so as to fall on the summit of the tower or castle wall, and give free access to the assailants. These towers, which were the last improvement on the ram, were so arranged that they were not only fought but propelled by men, either within the structure, or placed behind it, in such a manner as to be protected by it from the shot of the enemy. They continued to be in use during all the middle ages, and were still effective until ordnance was so much improved that it could be discharged rapidly and with correct aim.

BATTERSEA, a parish of Surrey, England, 4 m. S. W. of St. Paul's cathedral, forming one of the suburbs of London; pop. in 1871, 10,560. A wooden bridge over the Thames connects this parish with Chelsea, and a suspension bridge with the metropolis. It was formerly much occupied by market gardeners, who supplied London with vegetables, but is now building up with villas.

BATTERY, Galvanic. See GALVANISM.

BATTERY (law Lat. *battere*, from Saxon *batti*, a club), as defined by Blackstone, the unlawful beating of another. But if beating be here taken in its usual sense, the definition is not nice enough; for the offence includes every unlawful or wrongful touching of another's person against his will or without his consent, whether it be in the form of violence or of mere constraint. A battery is the consummation of the act, the threat or attempt of which constitutes an assault. (See ASSAULT.) As every battery is reached through an assault, these two offences are often described by the latter word alone, though the phrase of the law, assault and battery, sometimes used in common speech, preserves the proper legal distinction. Thus the unlawful raising of the hand or of a weapon, as if to strike another, is an assault; the actual infliction of the threatened blow is a battery.—The law makes one's person inviolable. Therefore not only is a blow a battery, but so also is spitting upon one, throwing water or any other substance upon him, pushing him, or pushing another person or anything against him. And the inviolability of a man's person extends to all that at the time pertains to it. Thus it is a battery to strike one's cane in his hand, or the clothes on his body, or a horse on which he is riding so that he is thrown. Taking indecent liberties with a woman, kissing her or otherwise touching her without her consent or against her will, are also batteries. It is not necessary that the injury should be done by the hand of the aggressor; for the offence is committed not only by striking another with a stick or with a stone thrown at him, but also by urging on a dog so that he bites him, or by driving a horse over him, or driving a wagon against that in which the other is riding, so that he sustains bodily injury. Nor need the injury be immediately done by one to make him guilty. This principle is illustrated by the cases of those who abet one who maliciously fights or beats another, or of one who procures another to commit an assault and battery, or of a shipmaster who suffers any one under his control to commit a battery on board his ship upon one of his crew or passengers. It is immaterial whether the act be done with violence or in anger, or result from the omission of that care which the law requires every one to exercise toward others. Thus when A threw a lighted squib among a crowd of people, and it was thrown from hand to hand by several in their attempts to escape it, till it fell upon B and put out his eye, it was held a battery by A. So, one who rides with and assents to the reckless and unlawful driving of another, whereby a person is run over, is himself guilty of the battery. But the intention may be material so far as it determines the character of the act of touching another without his permission. For to put one's hand on another for the mere purpose of attracting his attention is innocent; and so it is if the injury was entirely acci-

dental and undesigned, not merely in fact, but in view of that rule of the law which imputes guilty negligence when there is lack of due care. Upon these principles one is guiltless when his horse runs without his fault and injures another. And if an officer, authorized to arrest one, lays his hands upon him, or uses only necessary force, for the purpose of making the arrest, he is justified; or if one is threatened with an assault, or another attempts wrongfully to deprive him of his goods, he may justifiably use sufficient violence on the wrong doer to protect his person or property. But the use of any excessive violence in such a case, that is to say, of any more violence than is necessary to prevent the threatened injury, is a battery. The reasonable chastisement of a child by his parent or his schoolmaster is not battery; nor is the reasonable even though forcible restraint of a lunatic by his keeper, or the seizing or holding of one who is about to commit an assault, or the wresting of a weapon from him.—Battery is a misdemeanor by the common law, punishable by fine and imprisonment; and the party injured may also have his private civil action for damages.

BATTEUX, Charles, a French writer on æsthetics, born May 6, 1713, died July 14, 1780. He was appointed professor at the collége de Lisieux in Paris, and at the collége de Navarre, and subsequently Greek and Latin professor at the collége de France. In his *Beaux arts réduits à un seul principe* (Paris, 1746), and *Histoire des causes premières* (1769), he opposed mannerism and conventionalities, and strove to bring art and philosophy back to a closer harmony with nature. This theory was opposed to the opinions of many of his academical friends, and led to the suppression of the chair which he filled at the collége de France. In 1754 he became a member of the academy of inscriptions and belles-lettres, and in 1761 of the French academy.

BATTHYÁNYI. I. Kázmér, count, a Hungarian statesman, born June 4, 1807, died in Paris, July 13, 1854. In early life he passed some time in England, and upon his return to his native country he joined the liberal party, became a member of the Hungarian diet, and in 1848 took an active part in the national war in defence of the southern border. After having officiated as governor of various districts, he became in 1849 minister of foreign affairs under the administration of Kossuth, and subsequently shared Kossuth's exile in Turkey till 1851, when he repaired to Paris. In that year he addressed a series of letters to the London "Times," in which he reflected rather severely upon Kossuth's character as a statesman and patriot. **II. Lajos,** a member of the same family, born in Presburg in 1809, shot in Pesth by order of the Austrian government, Oct. 6, 1849. He was a cadet in the Austrian army at the age of 16, and afterward travelled extensively, but returned to Hungary to take a part in the reform movement of the time. He was one of the leaders of the opposition in the diets of 1839–'40 and 1843–'4, and in 1847 was preëminently instrumental in promoting Kossuth's election to the house of deputies. After the revolution of March, 1848, he was prime minister of the national administration, in which capacity he evinced equal patriotism and moderation. When the war was precipitated by the manœuvres of the court, he resigned and made some fruitless efforts to bring about a reconciliation. At the opening of 1849 he was one of a deputation from the Hungarian diet to make peace overtures to Windischgrätz, who with the Austrian army was approaching Buda-Pesth. The Austrian general refused to listen to the proposition, and the seat of the revolutionary government was removed from Pesth to Debreczin. Batthyányi remained at Pesth, where he was arrested Jan. 8, 1849, and on Oct. 5 following sentenced by a court martial, presided over by Marshal Haynau, to die on the gallows. He stabbed himself with a dagger, and inflicted so many wounds on his neck that he could not be hanged, and accordingly he was shot. His estates were confiscated, but restored to his family on the restoration of the Hungarian constitution in 1867.

BATTLE, a market town of Sussex, England, 56 m. by rail S. E. of London, and 7 m. from Hastings, named from the battle of Hastings, between William the Conqueror and King Harold II., which was fought near the town, Oct. 14, 1066. On the spot where Harold's banner had been planted, William founded a great abbey, the magnificent gateway of which still remains. There are extensive mills for the manufacture of gunpowder in the vicinity of Battle.

BATTLE AXE, an ancient military weapon of offence, unused by the Greeks or Romans, and apparently of oriental or northeastern European origin. The Amazons are always described as armed with the double-headed battle axe, *bipennis*, and in the enumeration of the Persian host at Marathon Herodotus mentions the Sacæ as fighting with brazen shields and battle axes. Horace speaks of the Rhæti and Vindelici, barbarians of the Alps, as armed from the remotest times with Amazonian axes. The axe does not, however, appear to have become a general instrument of war until the descent of the Teutonic nations, all of whom used some modification of this weapon, which alone was capable of crushing in or cleaving asunder the linked steel mail. The axe of the Saxons, who were a nation of foot soldiers, soon assumed the form of the bill, glaive, or *gisarme*, which with the bow became the national weapon of the English infantry. The Normans, who were especially cavaliers, retained the old form of the battle axe, with a heavy axe blade forward of the shaft and a sharp spike behind it, besides a point perpendicular to the handle, which could be used for thrusting at an enemy. The battle axe was carried slung on one side of the pommel of the man-at-arms' saddle, as was the

mace at the other; it was of great weight, often 10 pounds or over.

BATTLE CREEK, a city of Calhoun county, Michigan, at the junction of Battle creek with the Kalamazoo river, 120 m. W. of Detroit, on the Michigan Central and the Peninsula railroads; pop. in 1870, 5,838. It is in the vicinity of quarries of superior sandstone, and contains a number of woollen factories, flour mills, saw mills, machine shops, 4 grammar and 19 primary schools, and several churches. Five newspapers and periodicals are published here.

BATU KHAN, Mongol sovereign of Kaptchak, died in 1255. On the death of his father, Tushi, about 1224, he received from his grandfather Genghis Khan the rule over the western conquests, E. and W. of the Volga, out of which he subsequently organized the khanate of Kaptchak or of the Golden Horde. On the death of Genghis, in 1227, he acknowledged the supremacy of his uncle Oktai as great khan, and accompanied him in his expedition against China, and at his command swept over Russia, Poland, Hungary, and Dalmatia. He fought Henry, duke of Lower Silesia, at Wahlstadt in 1241, and Bela IV., king of Hungary, on the Sajó, in 1242. Bela fled into Dalmatia, whither Batu followed him and ravaged that territory, but retreated the next year. He held Russia for 10 years.

BATUTA, Ibn, Mohammed ibn Abdallah, a Moorish traveller and theologian, born at Tangier in 1302, died about 1378. He made extensive journeys between 1325 and 1353 over Egypt, Syria, Arabia, Persia, China, Tartary, Hindostan, the Maldive islands, the Indian archipelago, central Africa, and Spain, and wrote an account of his travels, the original manuscript of which has not been discovered, although supposed to have been preserved at Cairo or at Fez, to which latter place he returned after the completion of his travels. Fragments of his manuscript were epitomized by Mohammed ibn Tazri el-Kelbi, and extracts of this epitome were made by another Moorish admirer of Batuta, named Mohammed ibn Fal. This "Extract of an Epitome," as it is called, fell into the hands of Burckhardt, who bequeathed it to the English university of Cambridge. A translation of the "Extract," by the Rev. Samuel Lee of Cambridge, appeared in 1828, in the publications of the oriental translation fund. A French version of Batuta's travels was published at Paris in 1853, in 4 vols. 8vo.

BATYUSHKOFF, Constantin Nikolayevitch, a Russian poet, born at Vologda, May 29, 1787, died there, July 29, 1855. He was educated at St. Petersburg, took part in the campaign against Finland and in the French wars of 1813–'14, was some time librarian in the public library of St. Petersburg, and was subsequently attached to the foreign office at home, and to the Russian embassy at Naples. He wrote in prose on Russian literature, and translated Schiller's "Bride of Messina" into Russian. He lost his mind in 1818. A complete edition of his poems appeared at St. Petersburg in 1834, and in Smirdin's collection of classic Russian poets.

BAUCHER, François, a French teacher of horsemanship, born at Versailles about the beginning of this century, died in 1873. He invented a system of equine gymnastics, a portion of which, the method of suppling the horse's neck and jaw, has passed into general use and is adopted by every skilful trainer of saddle horses. By a progressive series of flexions the muscles are made so supple and yielding that the animal ceases to bear or pull upon the bit; while by the application of the whole system he comes to have no will except that of his rider. Baucher was repeatedly employed by the French government to train horses for the cavalry service; but the refinements of his method were not suited to that purpose. He had many partisans in foreign countries, and was a personal favorite with the duke of Wellington. He wrote in defence of his system, and his *Méthode d'équitation basée sur de nouveaux principes* (Paris, 1842; 11th ed., 1859) has been translated into many languages. In the United States it has been published under the title "Method of Horsemanship on new Principles" (Philadelphia, 1852).

BAUCIS, in mythology, a Phrygian woman, who, with her husband Philemon, entertained Jupiter and Mercury when they, while travelling in disguise, had been refused hospitality throughout their route. A deluge destroyed the inhospitable people, but Baucis and Philemon were saved. At their request the gods transformed their cottage into a temple, in which they could act as priest and priestess. They expressed a desire to die together, and Jupiter changed them into trees.

BAUDELOCQUE, Jean Louis, a French surgeon and accoucheur, born at Heilly, department of the Somme, in 1746, died May 1, 1810. He went to Paris at an early age, studied anatomy, surgery, and obstetrics, and obtained the first prize awarded in the school of practical anatomy. About 1771 he was appointed first surgeon to the hospital La Charité, but after a few years began to devote himself more exclusively to midwifery, in which he soon acquired a commanding reputation, and was appointed professor of midwifery in the school of hygiene, and surgeon-in-chief to the maternity hospital. He was generally recognized as standing at the head of the obstetricians of Paris, and was selected by Napoleon as chief accoucheur to the empress Maria Louisa. He was one of the earliest practitioners who made use of the forceps as a means of delivery in difficult parturition. His works are: *Principes de l'art des accouchements* (Paris, 1775; 5th ed., 1821); *An in Partu propter Angustiam Pelvis impossibili Symphysis Ossium Pubis secanda?* (1776); and *L'art des accouchements* (1781; 6th ed., 1822).

BAUDENS, Jean Baptiste Lucien, a French military surgeon, born at Aire, Pas-de-Calais, April

3, 1804, died in Paris, Dec. 3, 1857. He founded a hospital in Algiers, in which he taught anatomy and surgery for nine years. He was in most of the African campaigns, and figures in two of Horace Vernet's paintings. In 1841 he became director of the Paris military hospital of instruction, the Val-de-Grâce. During the Crimean war he was a member of the sanitary committee of the army. His principal works are: *Nouvelle méthode des amputations* (Paris, 1842), and *La guerre de Crimée, les campements, les abris, les ambulances, les hôpitaux*, &c. (Paris, 1857; 2d ed., 1862; Ger. translation, Kiel, 1864).

BAUDIN, Nicolas, a French sea captain and naturalist, born on the island of Ré in 1750, died in the Isle of France, Sept. 16, 1803. He entered the merchant navy at an early age, and in 1786 went on a botanical expedition to the Indies, sailing from Leghorn under the Austrian flag, with a vessel under his own command. His collections in this expedition, and in a second expedition which he made to the West Indies, were presented by him to the government of France, which promoted him to the rank of captain, and sent him in 1800 with two corvettes on a scientific mission to Australia. Péron accompanied him and wrote an account of the voyage (*Voyage aux terres australes*, Paris, 1807).

BAUDIN DES ARDENNES, Charles, a French naval officer, born at Sedan, July 21, 1784, died in Paris in June, 1854. In 1812, as lieutenant in command of the brig Renard, accompanying an expedition of 14 sail with munitions from Genoa to Toulon, he conducted his convoy safely into the harbor of St. Tropez, though continually pursued by English cruisers; but his flag ship was immediately after attacked by an English brig, which he disabled after a desperate conflict. For this service he was made captain of a frigate. After the restoration he resigned, and in 1816 entered the merchant service, but after the July revolution reëntered the navy. In 1838 he was made rear admiral, and commanded an expedition of 23 ships against Mexico. Failing to effect an amicable settlement with the Mexican government, he bombarded, Nov. 27, 1838, the fortress of San Juan de Ulloa, which surrendered on the following day. On Dec. 5 he made an attack on Vera Cruz, which was repelled by the Mexicans under Santa Anna, who lost a leg in the action; and the French were compelled to reëmbark and retire from Mexico. Baudin was now promoted to the rank of vice admiral, and in 1840 was sent as military and diplomatic plenipotentiary to the republic of Buenos Ayres, and intrusted with the chief command of the French fleet in the South American waters. He was marine prefect at Toulon from 1841 to 1847. In March, 1848, he was appointed commander of the French fleet in the Mediterranean, and on May 15, when Naples was threatened by the lazzaroni and soldiery, the presence of his fleet kept the rioters in check. In September the French fleet, in conjunction with that of Great Britain, protected Messina against the designs of Filangieri. Baudin was also successful in recovering at Naples and Tunis sums due to French residents. In July, 1849, he withdrew from active service.

BAUDRAIS, Jean, a French author, born at Tours, Aug. 14, 1749, died May 4, 1832. He began his literary life at Paris by writing *L'allégresse villageoise*, in honor of the dauphin's marriage, 1781. He was a revolutionist and enemy of Louis XVI., whose last testament he countersigned as witness. He was employed in various magisterial posts during the republic and the consulate, and eventually at the colony of Guadeloupe, whence he was transferred to Cayenne. He refused to take the oath of allegiance to Napoleon, was removed from his office, and emigrated to the United States, where he passed 13 years, living by manual labor. His chief work is his unfinished *Essai sur l'origine et les progrès de l'art dramatique en France* (3 vols., Paris, 1791).

BAUDRILLART, Henri Joseph Léon, a French political economist, born in Paris, Nov. 28, 1821. He published essays on Voltaire (1844), Turgot (1846), and Madame de Staël (1850), and in 1853 a work on *Jean Bodin et son temps*, for which the academy awarded him the first Monthyon prize. Since 1855 he has been chief editor of the *Journal des économistes*. He is also connected with the *Journal des Débats*, having married in 1866 the daughter of its chief editor, M. de Sacy; and he was editor-in-chief of the *Constitutionnel* in 1868 and 1869. In 1866 he was appointed professor of the history of political economy in the collége de France. He is a writer for the principal cyclopædias, for the *Revue des Deux-Mondes*, and other periodicals, and is the author of many works relating to political economy, moral science, spiritualism, and the progress of the laboring classes and of trades unions. His *Manuel d'économie politique* (1857) obtained from the French academy the Monthyon prize, and his *Des rapports de la morale et de l'économie politique* (1860) received a prize medal. Among his other works are: *Études de philosophie morale et d'économie politique* (2 vols., 1858); *La liberté du travail, l'association et la démocratie* (1865); and *Éléments d'économie rurale, industrielle et commerciale* (1867).

BAUER, Anton, a German jurist, born in Göttingen, Aug. 16, 1772, died there, June 1, 1843. He was a professor in Marburg and in Göttingen, and in 1840 was appointed privy judiciary councillor. His principal works are: *Lehrbuch des Naturrechts* (Marburg, 1808; 3d ed., Göttingen, 1825); *Grundzüge des philosophischen Strafrechts* (1825); and *Lehrbuch des Strafprocesses*, a revised edition of a previous work (Göttingen, 1835; 2d ed., 1848).

BAUER, Bernard, abbé, a French priest, born in Pesth, Hungary, in 1829. He was a member of a wealthy Jewish family, left his studies to

enlist in the French army in 1848, and after an adventurous life became a convert to the Roman Catholic church and joined the Carmelite order. His eloquence acquired for him a great reputation in Germany and France; and he became honorary canon, apostolical prothonotary, and chaplain at the Tuileries. He was a special favorite of the empress Eugénie, whom he accompanied to Egypt at the opening of the Suez canal. During the siege of Paris he figured as chaplain of the ambulances of the press, having under his orders 800 *frères chrétiens*, dressed as priests, though not in holy orders. He often showed himself on horseback, dressed in a soutane and long boots, with the grand cross of the legion of honor on his breast, and an episcopal ring on his finger. He has published *Le Judaïsme comme preuve du Christianisme*, a series of lectures which he had delivered in 1866 in Vienna and Paris; *Napoléon III. et l'Europe en* 1867, a political pamphlet (Paris, 1867); and *Le but de la vie*, a collection of his sermons preached at the Tuileries (1869).

BAUER. I. Bruno, a German critic and theologian, born at Eisenberg, Sept. 6, 1809. Educated in Berlin, he became in 1834 a teacher at the university there. He was then a Hegelian philosopher of the old school. In 1835 he severely criticised Strauss's "Life of Jesus," proposing to reconcile the free action of reason with the Christian revelation, which, in common with Hegel, he regarded as a gradual self-revelation of human reason. This position he abandoned in 1839. In that year he was transferred to Bonn, but in 1842, on account of the rationalistic boldness displayed in his writings and lectures, was deprived of permission to give public instruction. He then returned to Berlin and devoted himself entirely to historical and critical publications. In these writings he asserts that the gospels, as well as the Acts of the Apostles and the principal epistles of Paul, are fictions, written during the 2d century with a view to account for the rapid spread of Christianity at a time when the original history of its establishment had already fallen into obscurity; that religion should be abolished, and that science and ethics of human reason should be substituted; and that all attempts at apologizing for the scientific deficiencies of Christianity and revealed religion in general are futile. His principal works are: *Kritik der evangelischen Geschichte des Johannes* (Bremen, 1840); *Kritik der evangelischen Geschichte der Synoptiker* (2d ed., 3 vols., Leipsic, 1841–'2); *Kritik der Evangelien* (2 vols., Berlin, 1850–'51); *Die Apostelgeschichte* (1850); and *Kritik der Paulinischen Briefe* (1850). Of his minor works are to be mentioned *Die Judenfrage* (Brunswick, 1843), in which he protested against the emancipation of the Jews, who according to his views were first to emancipate themselves by abandoning their clannishness, religion, and trading in money. His *Allgemeine Literaturzeitung* (Charlottenburg, 1843–'4), his works on the history of the French revolution, on German history since the French revolution, and on the causes of the futility of the revolution of 1848–'9, though still democratic in spirit, were partly directed against the utopian tendencies of the revolutionary party. In his later writings (on the "Dictatorship of the Western Powers, 1855, on the "Position of Russia," 1855, &c.) he evinced a more and more decided leaning toward political conservatism, of which he has ultimately become a champion. **II. Edgar,** brother of the preceding, born at Charlottenburg in 1821. His pamphlet in defence of his brother Bruno (1842) was confiscated, and his *Censurinstruction*, written during the preparation of the trial, was also seized, but published in Bern in 1844. On account of his work *Der Streit der Kritik mit Kirche und Staat*, he was condemned in 1843 to imprisonment in the fortress of Magdeburg for four years. He was a co-worker with his brother in some of his publications, and prepared while in prison *Die Geschichte der constitutionellen Bewegung im südlichen Deutschland während der Jahre* 1831–'34 (3 vols., Charlottenburg, 1845–'6), and *Geschichte des Lutherthums*, in the *Bibliothek der deutschen Aufklärer* (5 vols., Leipsic, 1845–'7). After his release in 1848 he published a political review called *Die Parteien* (Hamburg, 1849), and *Ueber die Ehe im Sinne des Lutherthums* (Leipsic, 1849); and in 1857 appeared in Leipsic his *Englische Freiheit.*

BAUER, Georg Lorenz, a German theologian, born at Hilpoltstein, Aug. 14, 1755, died in Heidelberg, Jan. 12, 1806. He studied theology in Altdorf, and was minister and professor of theology in Nuremberg, Altdorf, and Heidelberg. He introduced into theology the principle that the Bible, like the works of the old classics, must be interpreted by grammatical and historical considerations, and not with reference to theological doctrines. He was among the first to elucidate the dogmatic opinions of the different Biblical writers, and to show the differences between them. He also shows the differences between the opinions of the Biblical writers on the one hand and the creed of the Lutheran church on the other, and was the first to write a systematic exposition of the Christian dogmas as they are contained in the Bible, and in each Biblical book in particular. Among his writings are: *Hermeneutica sacra V. T.* (Leipsic, 1797); *Biblische Theologie des Neuen Testaments* (Leipsic, 1800–'2); *Hebräische Mythologie des Alten und Neuen Testaments* (Leipsic, 1802–'3). Bauer was a distinguished orientalist, and translated the Arabian history of Abulfaraj.

BAUGÉ, a French town, department of Maine-et-Loire, 23 m. E. N. E. of Angers; pop. in 1866, 3,562. This town is celebrated in history for a battle fought between the English and the French in 1421, in which the former were totally defeated and their leader, the duke of Clarence, was killed. Near this town, at Baugé-le-Viel,

are the ruins of an old castle that formerly belonged to the dukes of Anjou.

BAUHIN, Jean, a Swiss physician and naturalist, born in Basel in 1541, died in 1613. He was a pupil of the botanist Fuchs at Tübingen, accompanied Conrad Gesner in his botanical excursions, travelled extensively over central Europe, and became court physician to Duke Ulric of Würtemberg. Bauhin cultivated in the ducal gardens of Montbéliard a great number of plants then recently introduced into Europe. His greatest work is *Historia Plantarum Nova et Absolutissima* (3 vols., Yverdun, 1650–'51).

BAUMANNSHÖHLE, a cave in the Hartz, in the duchy of Brunswick, on the left bank of the Bode, about 5 m. from Blankenburg. It is a cavity in a limestone mountain, divided into six principal apartments and several smaller ones, which are all profusely studded with stalactites. Fossil bones of the great cave bear and other animals are found here. It was named from a miner who discovered it in 1672.

BAUMÉ, Antoine, a French apothecary and chemist, born at Senlis, Feb. 26, 1728, died Oct. 15, 1804. He was the son of an innkeeper, and received an imperfect education; but he was apprenticed to the chemist Geoffroy, and was highly successful in scientific researches. At the age of 24 (1752) he was made a member of the college of pharmacy, Paris, and was soon after appointed professor of chemistry. He established a manufactory for the preparation of acetate of lead, muriate of tin, mercurial salts, antimonial preparations, and other articles for medicine and the arts, and manufactured for the first time in France sal ammoniac, previously imported from Egypt. He invented a process for bleaching raw silks, devised a cheap method of purifying saltpetre, improved the process for dyeing scarlet in the Gobelins manufactory, and made improvements in the manufacture of porcelain and in the areometer, constructing for the latter a scale which is still in use. Acquiring a competence, he abandoned manufacturing and devoted himself to the application of chemistry to the arts. He was a member of the academy of sciences (1773), and a correspondent of the institute (1796). His works are: *Dissertation sur l'éther*, and *Plan d'un cours de chimie expérimentale* (12mo, Paris, 1757); *Opuscules de chimie* (8vo, 1798); *Éléments de pharmacie théorique et pratique* (2 vols. 8vo, 1762, and later editions, 1769, 1773, and 1818); *Chimie expérimentale et raisonnée* (3 vols. 8vo, 1773); and several papers in the *Mémoires* of the academy of sciences, and in the *Dictionnaire des arts et métiers*.

BAUMGARTEN, Alexander Gottlieb, a German author, born in Berlin in 1714, died in Frankfort-on-the-Oder, where he was professor of philosophy, May 26, 1762. He was the founder of the science of æsthetics in his two works: *De Nonnullis ad Poema pertinentibus* (Halle, 1735), and *Æsthetica* (2 vols., Frankfort, 1750–'58, incomplete), which are written in the spirit of the Wolfian philosophy. Baumgarten was the first to attempt a scientific analysis of the principles of beauty in nature as well as in art, and of those faculties of the mind by which the beautiful is recognized. He maintained that the mind has a double faculty of perception, the higher or logical one, which forms reasonable notions establishing the truth, while the lower or æsthetic perceives immediately, without conscious reasoning, the elements of beauty. Other works of Baumgarten are *Metaphysica*, *Ethica Philosophica*, and *Initia Philosophiæ Practicæ*.

BAUMGARTEN, Michael, a German theologian, born at Haseldorf, in Holstein, March 25, 1812. He studied at Kiel, became professor at Rostock in 1850, and in 1858 he was removed on account of his alleged deviations from the established evangelical church, and tried for having published his vindication (*Eine kirchliche Krisis in Mecklenburg*, Brunswick, 1858), but acquitted. Since 1865 he has been prominent in the first Protestant German convention at Eisenach, and as the most energetic defender of the Protestant association. His writings include *Apostelgeschichte, oder Entwickelungsgang der Kirche von Jerusalem bis Rom* (2 vols., Brunswick, 1852; 2d ed., 1859); *Die Geschichte Jesu* (1859); and *David, der König ohne gleichen* (Berlin, 1862).

BAUMGARTEN, Sigmund Jakob, a German theologian, born at Wolmirstädt, March 14, 1706, died in Halle, July 4, 1757. He was a graduate of Halle, a follower of Wolf, and a friend of Semler, who after his death continued his *Allgemeine Weltgeschichte* (prepared from English sources, 16 vols., Halle, 1744–'56), and in 1758 published his biography. He was among the most influential theologians of the 18th century. His works include *Auszug der Kirchengeschichte* (3 vols., 1743–'6), *Nachrichten von einer Hallischen Bibliothek* (8 vols., 1748–'51), and *Nachrichten von merkwürdigen Büchern* (12 vols., 1752–'7).

BAUMGARTEN-CRUSIUS. I. Detlev Karl Wilhelm, a German philologist, born in Dresden, Jan. 24, 1786, died May 12, 1845. He studied theology and classical literature at Leipsic, and was a teacher and rector in the schools of Merseburg, Dresden, and Meissen, and a member of the Dresden municipal assembly in 1830. As teacher and legislator he brought about many reforms in the school system, and during the German war of independence he roused the enthusiasm of the German youth by his patriotic publications. He prepared pocket editions of many classic writers, and brought out a new edition of Müller's *Homerische Vorschule* (Leipsic, 1836). He also published a new biography of Georg Fabricius (Leipsic, 1839), besides miscellaneous, ethical, religious, and travelling sketches. **II. Ludwig Friedrich Otto,** a German theologian, brother of the preceding, born in Merseburg, July 31, 1788, died in Jena, May 31, 1843. He studied in Leipsic, and was over 25 years professor of theol-

ogy at Jena. His writings on the history of Christian dogmas made him prominent. He was in many respects a follower of Schleiermacher, and published in 1834 *Ueber Schleiermacher, seine Denkart, und sein Verdienst.*

BAUMGARTNER, Andreas von, baron, an Austrian statesman and savant, born at Friedberg, Bohemia, Nov. 23, 1793, died at Hietzing, near Vienna, July 28, 1865. He studied mathematics, and in 1817 became professor of physical science at Olmütz, and in 1823 in the university of Vienna. Ill health compelling him to refrain from teaching, he subsequently superintended various manufactories controlled by the government, and after 1846 he directed the construction of telegraphs and railways. He was minister of commerce and public works and of finance from 1851 to 1855, and in 1861 became a member of the house of peers. He popularized science in relation to art and industry, and his lectures were collected in a volume entitled *Mechanik in ihrer Anwendung auf Künste und Gewerbe* (2d ed., Vienna, 1823). His *Naturlehre* (1823; 8th ed., 1844–'5) and his contributions to periodicals diffused much knowledge of natural science; and his *Chemie und Geschichte der Himmelskörper nach der Spectralanalyse* (1862), and *Die mechanische Theorie der Wärme* (1864), contain his academical lectures on chemistry.—See Schrötter, *Freiherr von Baumgartner, eine Lebensskizze* (Vienna, 1866).

BAUMGARTNER, Gallus Jakob, a Swiss politician and historian, born at Altstätten, Oct. 18, 1797, died in St. Gall in July, 1869. He was the son of a mechanic, studied law, and became prominent as a leader of the liberal party in St. Gall till about 1841, when his alliance with the ultramontanes diminished his popularity, though his eloquence and executive ability led to his being chosen in 1843, and again in 1857–'60, as a member of various legislative bodies. He wrote *Die Schweiz in ihren Kämpfen und Umgestaltungen von* 1830 *bis* 1850 (4 vols., Zürich, 1853–'66).

BAUMGÄRTNER, Karl Heinrich, a German physiologist, born at Pforzheim, Baden, Oct. 21, 1798. He is a graduate of Heidelberg, and was professor of clinics there from 1824 to 1862, when he published *Vermächtnisse eines Klinikers.* He acquired renown by his observations on the development of animals, and by his investigations on the circulation of the blood. His medical works included *Handbuch der speciellen Krankheits- und Heilungslehre* (2 vols., Stuttgart, 1835; 4th ed., 1842), and *Grundzüge zur Physiologie und zur allgemeinen Krankheits- und Heilungslehre* (1837; 3d ed., 1854). These two works constitute his *Dualistisches System der Medecin.* Among his physiological publications are *Die Embryonalanlage durch Keimspaltungen* (1854), *Anfänge zu einer physiologischen Schöpfungsgeschichte* (1855), and *Schöpfungsgedanken* (Freiburg, 1856–'9).

BAUR, Ferdinand Christian, a German theologian, born at Schmiden, Würtemberg, June 21, 1792, died in Tübingen, Dec. 2, 1860. He was educated at Tübingen, became a clergyman and afterward a private tutor, and in 1817 was appointed professor at the seminary of Blaubeuern. He was at that period a follower of Neander and Schleiermacher, and published *Symbolik und Mythologie, oder die Naturreligion des Alterthums* (3 vols., Stuttgart, 1824–'5), which won for him in 1826 the chair of evangelical theology in the university of Tübingen, which he occupied during the rest of his life. He became the founder of the new Tübingen school of theology (see his letter to Hase of Jena, 1855, and his *Die Tübinger Schule,* 1859), which further developed his system of applying critical tests to the canonical writings. He denied the authenticity of the Gospel of St. John, and all the Pauline epistles except those to the Galatians, Corinthians, and Romans. He drew many inferences from Hegel without altogether identifying himself with the Hegelian system of philosophy, and was charged by his adversaries with having converted Hegelianism into pantheism, and positive Christian faith into Gnostic idealism, and with the subversion of the fundamental doctrines of orthodox Christianity. His followers, however, regard him as the greatest master mind in theology since the death of Schleiermacher. His works relating to the New Testament include *Die Christuspartei in der korinthischen Gemeinde, der Gegensatz des paulinischen und petrinischen Christenthums* (in the Tübingen *Zeitschrift für Theologie,* 1835); *Die sogenannten Pastoralbriefe des Apostels Paulus* (Stuttgart, 1835; 2d ed., 1866–'7); and *Paulus, der Apostel Jesu Christi, sein Leben und Wirken, seine Briefe und seine Lehre* (1845). The last named work contains the general result of all his investigations relating to St. Paul, and his *Kritische Untersuchungen über die kanonischen Evangelien, ihr Verhältniss zu einander, ihren Ursprung und Charakter* (Tübingen, 1847), gives his researches relating to St. John, St. Luke (which two had been previously published in 1844 and 1846 respectively), St. Mark, and St. Matthew. His works on dogma, based on historical treatment, comprise *Das Manichäische Religionssystem* (1831); *Die christliche Gnosis, oder die christliche Religionsphilosophie* (1835), from the 2d to the 19th century; *Die christliche Lehre von der Versöhnung* (1838); *Die christliche Lehre von der Dreieinigkeit und Menschwerdung Gottes* (3 vols., 1841–'3); and *Lehrbuch der christlichen Dogmengeschichte* (Stuttgart, 1847; 3d ed., 1867). Against the symbolism of Möhler he published *Erwiderung gegen Möhler's neueste Polemik* (1834), *Gegensatz des Katholicismus und Protestantismus* (2d ed., 1836), and other writings. Among his last and most extensive historico-ecclesiastical productions are *Epochen der kirchlichen Geschichtschreibung* (1852), and a history of the Christian church to the 19th century (5 vols., 1853–'63), the last two volumes of which, left nearly completed, were

edited by his son, Professor Ferdinand Friedrich Baur, and by E. Zeller. Other posthumous works edited by his son are *Vorlesungen über neutestamentliche Theologie* (Leipsic, 1864), and *Vorlesungen über die christliche Dogmengeschichte* (1865 *et seq.*).

BAUSSET, Louis François de, a French cardinal, born at Pondicherry in 1748, died in Paris, June 21, 1824. He was sent to France when young, educated at the seminary of St. Sulpice, took orders, and became bishop of Alais in 1784. In 1787 he was elected a deputy to the assembly of notables at Versailles, and subsequently to the states general. When this assembly undertook to alter the church establishment, Bausset was one of the signers of the protest presented by the clerical members. He afterward emigrated, but returned to Paris in 1792, when he was imprisoned. He was restored to liberty on the revolution of the 9th Thermidor. Having obtained all the manuscripts left by Fénelon, he wrote his biography (*Histoire de Fénelon*, 3 vols. 8vo, 1808–'9), which was received with marked favor. On the second return of the Bourbons he entered the chamber of peers, was admitted to the French academy in 1816, was created a cardinal in 1817, then commander in the order of the Holy Ghost, and minister of state. He also wrote *L'Histoire de Bossuet* (4 vols., 1814), and several historical memoirs.

BAUTAIN, Louis Eugène Marie, a French philosopher and theologian, born in Paris, Feb. 17, 1796, died Oct. 18, 1867. When only 20 years old he was appointed professor of philosophy at Strasburg, where he acquired reputation for his learning and eloquence. Ordained a priest in 1828, he became director of the seminary. In 1830 he resigned his professorship, but was eight years later elected dean of the literary faculty of Strasburg, in which capacity he continued till 1849. He then became superintendent of the college of Juilly, and was subsequently vicar general of Paris and professor in the theological faculty of that city. He published *Psychologie expérimentale* (2 vols., 1839), *Philosophie morale* (2 vols., 1840), *Conférences sur la religion et la liberté* (1848), and other works.

BAUTZEN (Lusatian, *Budissin*), a town of Saxony, capital of Upper Lusatia, on the Spree, 31 m. E. N. E. of Dresden; pop. in 1871, 13,165. It has a cathedral, owned in common by the Catholics and Protestants, two public libraries, a hospital, and manufactures of woollen and linen cloths, paper, and leather. The battle of Bautzen was gained May 20 and 21, 1813, by Napoleon, with about 125,000 men, over the allied Prussians and Russians, numbering nearly 100,000. The engagement began early in the morning of May 20, and the French easily gained possession of the town, but Oudinot failed in his attacks on the left wing of the enemy. On the following and decisive day they captured Preititz and the heights of Gleina, while Soult stormed those of Kreckwitz, the key to Blücher's position. The allied monarchs, being now reminded of their danger of being crushed by Ney, who had already attacked the right flank of their forces, effected a masterly retreat without losing a gun.

BAUXITE. See ALUMINA.

BAVAI. See BAVAY.

BAVARIA (Ger. *Bayern* or *Baiern*), a kingdom of central Europe, next after Prussia the most important member of the German empire. Capital, Munich. Bavaria consists of two parts, separated by Hesse-Darmstadt, Baden, and Würtemberg, the shortest distance between the divisions being 30 m. The larger or eastern division, lying between lat. 47° 15′ and 50° 35′ N., and lon. 9° and 13° 50′ E., is bounded N. by Saxony, Reuss, Saxe-Coburg-Gotha, Saxe-Meiningen, Saxe-Weimar, and the Prussian province of Hesse (Cassel); E. by the Austrian empire; S. by Switzerland and the Austrian empire; and W. by Hesse-Darmstadt, Baden, and Würtemberg. The smaller division, known as the Palatinate (Ger. *Pfalz*) or Rhenish Bavaria, lies on the W. bank of the Rhine, between lat. 48° 57′ and 49° 50′ N., and lon. 7° 5′ and 8° 30′ E. It is bounded N. by Hesse-Darmstadt and Rhenish Prussia; E. by the Rhine, which separates it from Baden; S. by Alsace-Lorraine; and W. by Rhenish Prussia. Area since the peace of 1866, in which 213 sq. m. were ceded to Prussia, 29,292 sq. m. The population according to the census of 1871 was 4,861,402. The increase during the last 50 years has been nearly 25 per cent.; as the total population in 1818 numbered 3,707,966. In 1867, in a total population of 4,824,421, there were 3,441,029 Roman Catholics, 1,328,713 Protestants, 4,839 other Christian sects, and 49,840 Jews. The Protestants were divided into 989,343 Lutherans, 3,267 Reformed, and 336,103 United Evangelicals. In 1871 the Roman Catholic population embraced several thousand Old Catholics. The number of persons who emigrated from Bavaria amounted from 1830 to 1869 to about 288,000. The kingdom and population are distributed in eight *Regierungs-Bezirke* (administrative districts), as follows:

DISTRICTS.	Area in sq. m.	Pop., Dec. 31, 1846.	Pop., Dec. 31, 1855.	Pop., Dec. 31, 1871.
1. Upper Bavaria (Oberbayern)	6,582	705,544	744,151	841,579
2. Lower Bavaria (Niederbayern)	4,157	543,709	554,013	602,005
3. Palatinate (Pfalz)	2,293	608,470	587,334	615,104
4. Upper Palatinate and Ratisbon (Oberpfalz und Regensburg)	3,731	467,606	471,906	497,960
5. Upper Franconia (Oberfranken)	2,702	501,163	493,913	540,963
6. Middle Franconia (Mittelfranken)	2,918	527,866	533,587	583,417
7. Lower Franconia and Aschaffenburg (Unterfranken und A.)	3,243	592,080	589,076	586,122
8. Swabia and Neuburg	3,666	558,436	561,576	582,888
Army of Occupation in France	.....	.....	.....	11,364
Total	29,292	4,504,874	4,541,556	4,861,402

The population is almost exclusively of Germanic origin. A few ~~hundred~~ thousand inhabitants of the Fichtel mountains, who are of Slavic descent, have long since been fully Germanized; only in the Palatinate there are about 3,500 Frenchmen. Three original Germanic tribes constitute the population: the Boioarians or Bavarians, between the Allgau Alps and the so-called Franconian Jura, and the rivers Lech, Inn, and Salzach; the Franconians or Franks, between the Franconian Alps, the Thuringian and Bohemian mountains, and in the Palatinate; and a branch of the Swabians bordering on Würtemberg. The Franconians number about 2,500,000, the Swabians 500,000; the rest are Bavarians.—Bavaria is an elevated country, hilly rather than mountainous, on the borders of which are the Bavarian Alps, in the south; the Bohemian Forest, in the east; the Fichtelgebirge and the Franconian Forest, in the northeast; and the Rhön and Spessart, in the northwest. The Bavarian Forest, the Franconian Jura, and other minor ranges, traverse the interior, N. of the Danube. The Palatinate is traversed by the Hardt mountains, a branch of the Vosges. The highest point is the Zugspitz, about 10,000 ft., in the Bavarian Alps; in the Bohemian Forest, the highest points are the Arber, 4,800 ft., and Rachelberg, 4,750 ft.; in the Fichtelgebirge, the Schneeberg is 3,480 ft.; in the Rhön the highest point is about 3,000 ft.; Donnersberg, the culminating point of the Hardt mountains, is about 2,200 ft.—The rivers of the Palatinate belong to the basin of the Rhine; the principal ones are the Lauter, Queich, Blies, and Nahe. The rivers of Bavaria proper are the Main and Danube and their affluents. The principal tributaries of the Main are the Regnitz and Saale. The Danube flows for 270 m. through the centre of the kingdom, until at Passau it enters Austria, being navigable throughout this distance. It receives in Bavaria more than 30 considerable affluents, the chief of which are the Iller, Lech, Isar, and Inn from the right; from the left the Wörnitz, Altmühl, Kocher, Naab, Regen, and Ilz. Bavaria has several small lakes, the principal of which are the Chiem, Wurm, and Ammer, all situated at the foot of the Bavarian Alps. The circuit of none of these exceeds 40 m. A corner of the lake of Constance also belongs to Bavaria.—The climate is for the most part healthy, although the temperature is variable. It is colder in the winter and warmer in the summer than that of the neighboring countries. In the mountains there are heavy falls of snow, and the Alps, the Fichtelgebirge, and the Bohemian Forest are distinguished from the lower land by the length and severity of their winters. There are extensive forests, especially upon the hills and mountain sides. Great quantities of wood are obtained from these, and distributed through all the surrounding countries. About one third of the forest land is the property of the state; the rest is in private hands. The soil is generally fertile, producing wheat, rye, oats, and barley; buckwheat, maize, and rice are also cultivated, and potatoes are an important crop. The hop thrives, and the vine flourishes in some parts, especially near Lake Constance and upon the lower course of the Main. Fruits, tobacco, hemp, flax, and licorice are cultivated. But upon the whole agriculture is in a backward condition. Cattle-raising is the most important industry on the slopes of the Alps; but, with the exception of sheep, little has been done to improve the breed of the domestic animals. The total area of the productive soil is 27,532 sq. m., of which 12,352 sq. m. are arable and garden land, 5,804 meadows and pastures, and 9,376 woodland. The latest agricultural statistics (1863) showed 368,528 horses, 3,185,882 horned cattle, 2,058,638 sheep, 926,522 swine, and 150,855 goats. The annual produce of wine is estimated at 16,218,000 gallons; that of raw tobacco at 114,676 cwt.—The mineral wealth of the country is very considerable. Coal and iron are found almost everywhere. In the Palatinate are mines of copper, manganese, mercury, cobalt, and plumbago. There are numerous choice varieties of marble, as also gypsum, alabaster, and some of the finest porcelain clay in Europe. Salt, which is a government monopoly, is produced by evaporation from the saline springs in the S. E. corner of the kingdom. Still the mineral wealth is to a great extent undeveloped. The production of salt in 1869 was 977,572 cwt.; of coal, 7,347,247 cwt.; and of iron in 1868, 961,382 tons. The most important article of industry is Bavarian beer, brewed to the highest perfection in Munich, Nuremberg, and Bamberg, and consumed in vast quantities in the country itself. The kingdom had in 1871 about 5,500 breweries, which brewed about 135,000,000 gallons. The mathematical and optical instruments manufactured at Munich are not surpassed by any in the world. Nuremberg is the great emporium for toys; Augsburg is noted for the production of gold, silver, and plated ware; the plumbago crucibles of Passau are exported to all parts of the world; and the ornamental glass of Bavaria rivals that of Bohemia. Coarse linen is the most important branch of textile manufactures, the production of cotton, woollen, and worsted goods not being equal to the home consumption. There are considerable manufactures of leather, straw goods, glass, nails, needles, and porcelain. The principal articles of export are timber, grain, wine, butter, cheese, and glass, the annual value being about $6,000,000. The principal imports are sugar, coffee, woollens, silks, cotton goods, drugs, hemp, and flax.—The central position of Bavaria gives it the transit trade between North Germany and Austria, Switzerland, and Italy. There are several canals, the principal of which, the Ludwig's canal, constructed by the government at a cost of $4,000,000, unites the Rhine and the Danube,

and through them the German ocean with the Black sea, and is one of the most important works of the kind in Europe. About the middle of 1871 Bavaria had 1,801 m. of railway in operation, a comparatively larger number than Prussia; 1,208 m. were state property or administered by the state, and 593 m. belonged to private companies. The aggregate length of telegraph lines in 1870 was 3,547 m., and that of telegraph wires 11,182 m.; the number of despatches was 858,705; the revenue derived from them, 447,690 fl., and the cost of administration 302,590 fl. The navigation on the Danube in 1871 employed 15 steamers and more than 2,000 sailing vessels, that on the Inn about 2,000 vessels, that on the Rhine 12 steamers and 236 sailing vessels. In 1869 Bavaria had 262 savings banks with an aggregate capital of 26,410,840 fl.; the number of depositors was 249,362.—The direction of education is under the control of the minister of public instruction, with inspectors who report to him on the condition of the schools. All children whose parents have not received permission to have them educated at home must attend the public school until they are 14 years old, and must also attend Sunday school two years longer. Every parish has at least one elementary school; besides which there are lyceums and other schools of a higher grade, and trade schools, supported by the communes, in which are taught mathematics, mechanics, chemistry, drawing, architecture, and other branches. The course in these schools occupies three years, from the age of 12 to 15, after which the pupil may enter one of the three polytechnic schools, the course of which occupies three more years, with another year for engineers. There are three universities, of which Munich and Würzburg are Roman Catholic, the latter celebrated for its medical faculty, and Erlangen is Protestant. The university of Munich had in 1870, next to Berlin and Leipsic, the largest number of professors (118) and students (1,321) of any German university. Of other higher institutions of learning, Bavaria in 1870 had 8 lyceums (schools of theology and philosophy), 28 *Gymnasien*, 6 *Real-Gymnasien*, 84 Latin schools, 33 *Gewerbschulen*, 10 normal schools, and 1 *Realschule*. The number of elementary schools in 1866 was 8,197, with 604,916 pupils. The polytechnic school of Munich, which was reorganized in 1868, and which had in 1871, in five special departments, 47 professors and 805 students, is the first in all Germany as regards the number of students. At Munich an academy of painting, a school of sculpture, and an architectural academy owe their establishment to King Louis I. The number of newspapers in 1866 in Bavaria was 339, of which 99 were strictly devoted to politics. At the head of them stands the Augsburg *Allgemeine Zeitung*, which enjoys a world-wide reputation.—Rather more than seven tenths of the population are Roman Catholics, but religion is entirely free, Protestants and Catholics having the same rights, and the sovereign may be either; civil rights have not, however, been extended to the Jews, or to one or two small Christian sects. The Catholics have 2 archbishoprics, Munich and Bamberg, 6 bishoprics, 171 deaneries, and 2,756 parishes, there being one clergyman to 464 souls. The Protestant church is under a general consistory and 4 provincial consistories; there are 920 parishes, and one clergyman to 1,013 souls.—Bavaria is a constitutional monarchy, the present constitution having been framed in 1818, but somewhat modified in 1848–'9. The crown is hereditary in the male line. The executive power is vested in the king, but is exercised through ministers who are responsible for all his acts. The diet consists of two houses. The *Reichsrath* or upper house is composed of the princes of the royal family, the crown dignitaries, the archbishops, and the heads of certain noble families; to these are added a Catholic bishop, the president of the Protestant consistory, and a number of other members appointed by the crown at pleasure; in 1871 it numbered 72. The lower house is composed of deputies from towns and universities and various religious corporations. The representation (154 members in 1871) is calculated at one deputy to 31,500 persons. The deputies are selected by electors who are chosen by popular vote. To be on the electoral lists, a person must be 25 years of age, and pay taxes to the amount of 10 florins. A deputy must be 30 years of age, and have an assured income from the funds, a trade, or a profession. According to the treaty of Versailles (Nov. 23, 1870), which regulated the entrance of Bavaria into the German empire, the Bavarian troops constitute two army corps of the German imperial army. In time of war the two Bavarian corps number 136,617 men. The military organization is in all essential points to be conformed to that of Prussia, but in the appointment of officers and the management of the army in time of peace greater rights have been accorded to the king of Bavaria than to any other German prince. The public debt amounted in 1870 to 343,000,000 fl. The towns, boroughs, and rural communities had in 1870 an aggregate debt of 27,269,235 fl. The budget of expenditures for each of the two years 1872 and 1873 was 58,629,558 fl.—The name *Bayern* is derived from the Boii, supposed by some to be of Celtic origin, who inhabited the country before the Christian era. Others, however, deny the Celtic origin, mainly on the ground that the Bavarian dialect bears no trace of it. Southern Bavaria formed a part of the Roman provinces of Rhætia, Vindelicia, and Noricum. After the fall of the Roman power the people were governed by their own dukes, from about 530 to 630, when the country became incorporated into the Frankish kingdom, and embraced Christianity. The Bavarians were still under the immediate government of their own dukes, several of whom revolted

against their Frankish sovereigns. The last revolt, under Thassilo II., in 777, was effectually suppressed by Charlemagne, whose descendants ruled Bavaria as kings till 911, when the Carlovingian line became extinct. From this time for a century and a half the country was convulsed with troubles, partly arising from internal dissensions, and partly from contests with the Magyars, and later from the crusades. In 1180 the count palatine Otto von Wittelsbach became duke, and his descendants have governed the country to the present time. One of these, Louis the Bavarian, was emperor of Germany from 1314 to 1347. Maximilian, duke of Bavaria, the head of the Catholic league in the 30 years' war, was made an elector in 1623, in lieu of the proscribed elector palatine Frederick. During the middle ages the Franconian part of Bavaria had become a centre of trade, industry, and art. Augsburg and Nuremberg rivalled Venice, Genoa, and Milan as mercantile entrepots. The Swabians raised Gothic architecture to its highest perfection, and excelled in poetry. In painting the Franconian school produced Albert Dürer, Lucas Cranach, and Hans Holbein. The minnesingers and mastersingers had their original homes in Franconia and Swabia. There originated the idea of a confederation of the free cities of Germany. The reformation found both stanch adherents and violent enemies in Bavaria, and within its limits Gustavus Adolphus fought both Tilly and Wallenstein. The discovery of America transferred the seat of the world's commerce to the Atlantic shore, and resulted in the decay of the free cities of Franconia and Swabia. Nuremberg, which in the 16th century had a population of 100,000, declined to a quarter of that number. It still, however, retained much of its old industry, and within the last 30 years has greatly prospered. In 1702 the elector of Bavaria took sides with Louis XIV. of France against Austria, England, and Holland, in the war of the Spanish succession. The French and Bavarian forces were defeated at Blenheim by the duke of Marlborough and Prince Eugene in 1704; the elector was put under the ban of the empire, and Bavaria was for ten years governed by imperial commissioners. In 1742 the elector Charles Albert was chosen emperor by a majority of the electors, and commenced hostilities against Austria; but the empress Maria Theresa, aided by England, defeated him and seized the electorate. Maximilian Joseph, the son and successor of Charles Albert, was restored to his possessions upon renouncing all claims to the imperial dignity. In December, 1777, the direct reigning line became extinct, and the succession devolved upon a collateral branch, governing the Palatinate. But the succession was claimed by the house of Austria, which took military possession of a part of Bavaria. Frederick the Great of Prussia supported the elector, and Austria resigned her pretensions upon receiving a small strip of disputed territory. In the early part of the wars growing out of the French revolution Bavaria furnished her contingent of troops to the Austrian army. In 1796 Moreau at the head of a French army entered Bavaria and took possession of the capital; a separate peace was concluded, the elector withdrew his contingent from the Austrian army and fell more and more under French influence; and when the war of 1805 broke out between France and Austria, Bavaria was a firm ally of the former. The victories of Ulm and Austerlitz enabled Napoleon to dictate terms of peace. He rewarded his ally by giving him considerable additional territory, and raising the elector to the royal dignity under the title of Maximilian Joseph I. The king, now the leading member of the Rhenish confederation, took part with France in the war against Prussia, which was decided by the battle of Jena (1806), and at the peace of Tilsit, 1807, Bavaria gained still more territory. In 1809 Austria, emboldened by the absence in Spain of a great part of the French army, declared war against France. The Bavarian troops formed the main body of the army with which Napoleon won the battles of Eckmühl and Wagram, and the king was rewarded by still further acquisitions of territory. The Bavarian troops formed part of the force with which Napoleon in 1812 invaded Russia. By this time Bavaria, like all the other German states, had become weary of the French domination. In 1813, when Napoleon fell back from Leipsic toward the Rhine, Maximilian declared war against him, and endeavored to cut off the retreat of the French; but the Bavarian army, under Wrede, was defeated at Hanau. From this time Bavaria acted vigorously with the allies against Napoleon, and by the treaties of 1814–'15 was confirmed in most of her acquired territories; receding, however, her possessions in Tyrol to Austria, but receiving equivalents in Franconia and on the Rhine. When the Germanic confederation was formed in 1815, Bavaria occupied the third place. Louis I. ascended the throne in 1825. Bavaria was little affected by the liberal movements of the next 20 years, but by 1848 general disaffection had arisen, which reached its culmination when the king fell under the influence of Lola Montez, and he was forced to abdicate in favor of his son Maximilian II., whose reign lasted till 1864. Maximilian's chief political aim was to hold the balance of power between Austria and Prussia. The present king, Louis II. (born Aug. 25, 1845), succeeded to the throne March 10, 1864. Until recently he followed the general policy of his predecessor. When in 1866 the war broke out between Prussia and Austria, Bavaria took part with the latter, suffered severe defeats, and was obliged to conclude a separate peace, ceding to Prussia a small tract of territory, 213 sq. m., with a population of about 34,000. In 1867 Bavaria joined the North German Zollverein. When the emperor Napoleon de-

clared war against Prussia in 1870, he counted upon the aid or at least the neutrality of the southern states of Germany; but Bavaria speedily entered into a close alliance with North Germany, placing her whole military force at the disposal of the Prussian king, and the Bavarian corps bore a distinguished part in the whole campaign. King Louis took the initiative in the measures which led to the establishment of the German empire. Toward the close of the year he wrote to the king of Saxony and several other princes, urging the consolidation of Germany under the king of Prussia as emperor. In becoming a part of the empire, January, 1871, Bavaria reserved some special rights as to her domestic autonomy, the control of her army, and representation abroad. The opposition among the Catholic clergy to the decision of the œcumenical council found in 1870 its foremost exponent in Dr. Döllinger, now rector of the university of Munich, and Bavaria has since been the principal battle ground of Old Catholicism.

BAVAY, or **Bavai,** a town of France, in the department of Nord, 13 m. E. S. E. of Valenciennes; pop. in 1866, 1,646. The town occupies the site of the ancient Bagacum or Baganum, the capital of the Nervii before the conquest of Gaul by Cæsar, and an important military post under the Romans till the end of the 4th century. The remains of an aqueduct, an amphitheatre, and ruined fortifications are among its many remarkable relics of the past; and it is the point of union of seven still existing Roman roads, called the Chausées de Brunehaut. Its manufactures are glass, earthen and hardware, iron implements, and sugar.

BAWIAN (Malay, *babi*, hog; Javanese, *bavi*, hog's abode), an island about 50 m. N. of Java and Madura, in lat. 5° 49′ S., lon. 112° 44′ E.; area, 42 sq. m.; pop. about 35,000, or more than 800 to the sq. m. The soil is of volcanic formation, like that of Java, and equally productive, and yet the island imports annually from Java and Bali about 2,000 tons of rice for the consumption of the inhabitants, who are chiefly fishermen and traders. The inhabitants speak a Madura dialect, and are undoubtedly descendants of colonists from that island. They are a simple, industrious people, and crimes against person and property are rare. Their chief exports are small horses for Java, and tripang for China, for which they take in exchange tools, unwrought iron, and coarse domestic cloths. The wild hog is abundant, but not a single carnivorous animal is to be found except the tanggalung, a species of civet cat. Hot springs abound, and here grows the valuable teak tree. There is a roadstead in a small bay on its S. coast, near the town of Sangyapura (city of imagination).

BAWR, Alexandrine Sophie Coury de Champgrand, baroness de, a French dramatist and novelist, born in Stuttgart in 1773, died in Paris, Jan. 1, 1861. She received lessons in musical composition from Grétry. She married when still young the count de St. Simon, the founder of the Saint Simonian school. Her husband, thinking her unfit to be the wife of the first man in the world, sued for a divorce, which was granted. Left to her own resources, Alexandrine composed songs (*romances*), and afterward wrote plays under the assumed name of M. François. In 1806 she married the wealthy baron de Bawr, with whom she lived for a few months in happy retirement; but a frightful accident carried him off suddenly; and a little later her fortune having been lost, she wrote some novels and plays which brought her both money and fame. Some of her plays are still occasionally performed, and her novels, *Le novice*, *Raoul, ou l'Énéide*, &c., were successful.

BAXTER, Andrew, a Scottish metaphysician and philosopher, born at Aberdeen in 1686 or 1687, died at Wittingham in 1750. He was a teacher of private pupils, gentlemen of rank, with whom he frequently travelled on the continent, spending some years in Utrecht. His greatest work is "An Inquiry into the Nature of the Human Soul, wherein its Immateriality is evinced from the Principles of Reason and Philosophy" (4to, 1730; 3d and best ed., 2 vols. 8vo, London, 1745; appendix, 1750). In this treatise some opinions are advanced which were more thoroughly argued by Priestley. In a later work, entitled *Matho, sive Cosmotheoria Puerilis* (2 vols. 8vo and 12mo), he attempted to simplify questions of science, and adapt them to the capacity of children. He left behind him many unfinished treatises. As a student he was indefatigable, spending whole nights in literary toil.

BAXTER, Richard, an English nonconformist clergyman and theological writer, born at Rowton, Shropshire, Nov. 12, 1615, died in London, Dec. 8, 1691. His early bias was toward religious meditation and exercises of piety; and this bias was confirmed by his research in the library of Mr. Wickstead, chaplain of the Ludlow council. A brief trial of life at court confirmed him in his determination to become a preacher; and after a short interval of teaching, during which his preparatory studies were diligently prosecuted, he was ordained at Dudley, at the age of 23. Two years later he became the minister of the important town of Kidderminster, where he was held in high esteem, notwithstanding his refusal to take the ecclesiastical oath. In the civil wars which soon after broke out, he took sides with the parliament, was chaplain in Whalley's regiment, and led for some years an unsettled life. He had no sympathy with the assumption of supreme power by Cromwell, and advocated the return of Charles II. to his father's throne. In return for his services to the cause of legitimacy, he was made one of the chaplains of the restored monarch, and was offered a bishopric, which his conscientious scruples about conformity compelled him to decline. His favor with the king, however, could not shield him from persecution. He was prohibited from

preaching, accusations of heresy were multiplied against him, and after numerous arrests he was brought at last, at the age of 70, before the tribunal of Judge Jeffreys, on charges of sedition and hostility to the episcopacy, founded on passages in his "Paraphrase on the New Testament." In the trial Jeffreys was a prosecutor as well as judge, abusing the prisoner, insulting his counsel, and imposing a fine of 500 marks, the defendant to lie in prison till the fine was paid, and to be bound to good behavior for seven years. Unable to pay the fine, he was committed to the king's bench prison, where he was confined 18 months, when his fine was remitted, and he was pardoned through the mediation of Lord Powis. Baxter, though a royalist in his principles and the advocate of an established church, was yet in his tastes and temper sternly puritan. He was a foe to all dissoluteness of life, to all arbitrary measures, to every kind of tyranny and oppression. His opposition to absolute power was uncompromising, and neither fear nor favor could bring him to yield it. He was a mediator among the sects; yet his views were so sharp and positive that he became, in spite of his desire, the founder of a school of theology which still continues to bear his name. Baxter's love for theological subtleties, not less than his restless promptness in taking hold of every subject of religious concern, involved him in perpetual controversy. He had many and noble friends, but he made a multitude of enemies both in church and state. His works, in every form, from bulky folios to pamphlets, number not less than 168 titles. Most of them are written in English; yet the *Methodus Theologiæ*, issued in 1674, showed a fair mastery of the Latin tongue. His treatises on "Universal Concord" and "Catholic Theology" failed to produce that harmony among sects which was the purpose of their publication. Baxter was a fearless metaphysician; yet that he was credulous of strange tales, and ready to believe marvels, is shown in his treatise "Certainty of the World of Spirits." The three works by which Baxter is best known are his "Saint's Everlasting Rest," his "Call to the Unconverted," and his autobiography, published five years after his death ("*Reliquiæ Baxterianæ:* A Narrative of his Life and Times," folio, 1696; edited by Dr. Calamy, 4 vols. 8vo, 1713). The first two of these works have a popularity which remains still undiminished. Doctrinally, these celebrated works are more liberal than his treatises of divinity. His works have been collected in 23 vols. 8vo, and his "Practical Works" in 4 vols., the latter many times reprinted.

BAXTER, William, an English philologist and archæologist, nephew of the preceding, born at Llanllugan, Montgomeryshire, in 1650, died in London, May 31, 1723. He had few advantages of instruction in his youth; and until the age of 18, when he entered the Harrow school, he knew not a single letter and no language but his native Welsh. In a few years, however, he was noted for his accurate knowledge, not only of the ancient dialects of Britain, but of the Greek and Latin classics. While a schoolmaster in a private school at Tottenham, in Middlesex, and afterward in the Mercers' school in London, he published most of his works. These consist of a Latin grammar, (1679), two editions of Anacreon (1695 and 1710), two editions of Horace (1701 and 1725), and *Glossarium Antiquitatum Britannicarum* (1719; new ed., 1733). After his death was published the letter A of a glossary of Roman antiquities, under the title of *Reliquiæ Baxterianæ, sive Guilielmi Baxteri Opera posthuma* (8vo, London, 1726; new ed., *Glossarium Antiquitatum Romanarum*, 1731).

BAY, an E. central county of Michigan, on Saginaw bay, watered by Rifle river and numerous other streams; area, 750 sq. m.; pop. in 1870, 15,900. The Flint and Père Marquette railroad extends to Bay City, in the S. E. part of the county, which is also traversed by the Jackson, Lansing, and Saginaw railroad. Lumber forms the principal industrial interest of the county. The chief productions in 1870 were 9,398 bushels of wheat, 1,799 of rye, 8,458 of Indian corn, 10,008 of oats, 26,505 of potatoes, and 3,538 tons of hay. There were 478 horses, 700 milch cows, 742 other cattle, and 453 swine. Capital, Bay City.

BAYADEER (Port. *bailadeira*, a dancing woman), a professional dancing and singing girl of India. The bayadeers, more commonly called nautchnees, or nautch girls, are recruited from almost every condition in life, but the better class are generally from the families of merchants and laborers. They are chosen for beauty, apprenticed to *dhyas*, themselves superannuated nautchnees, and subjected to a course of severe physical training, by which they acquire great suppleness and quickness of motion, and graceful carriage. They are also taught singing and various arts of adornment. The kite dance, in which the bayadeer assumes the various postures of one flying a kite, is among the most famous and popular of her performances. If, as is frequently the case, the nautchnee has been devoted to the service of the gods from her infancy, she enters a temple and becomes a *devadasee* or slave of the gods, taking rank according to the caste of her family, the importance of the divinity, and the endowment of the temple; here she assists at the formal services of the shrine, celebrates in songs, generally licentious, the deeds of the god or goddess, dances before the image, decks it with flowers, and attends it with dances and songs when it is carried abroad in procession. Devadasees are excluded from ceremonies of peculiar solemnity, such as funeral sacrifices and suttees. In order to be admitted to the sisterhood of devadasees the nautchnee must be under the marriageable age, and free from physical defect. If of a high caste, she is confined to the inner temple, and as long as

her charms survive she serves the passions of the Brahmans. If she has children, the girls are educated to be nautchnees and the boys musicians. The devadasees of the Soodra caste rank lower, but enjoy more freedom; when not on duty in the temples they are at liberty to go abroad, and their earnings are their own. They attend, when sent for, at the houses of the noble and the wealthy, to assist with their songs and dances at weddings and other feasts. The devadasees receive stated wages in money and rice. The inferior class add to these resources the fruits of an infamous profession. Every temple entertains a troop of 8, 12, or even more devadasees. Sometimes the nautchnee becomes a *kunchenee*, a *doomin-ca*, or a *bazeegharnee*, terms for the different

Bayadeer.

sorts of dancing girls who wander through the country in troops of 10 or 12 to entertain strangers with music and dancing. These attend at *chooltrees* or inns, or at the garden houses of wealthy Hindoos; and in all the large cities of Hindostan there are sets of these nautchnees under the management of dhyas, ready to be hired for religious or other purposes. The nautch girls form a distinct body in Hindoo society, living under the protection of government and regulated by the peculiar rules of their order. Their costume is cumbrous, of rich material, gayly colored, and consists of a pair of embroidered trousers, a petticoat containing at least twelve breadths, gold or silver fringed, and a *coortee* or vest, half hidden by an immense veil which crosses the bosom several times, hanging down in front, and at the back in broad ends. The hands, arms, neck, legs, toes, feet, ears, and nose are decked with gold and jewels, and the hair is braided with silver ribbons and confined with bodkins of beautiful workmanship. The dance is, strictly speaking, a pantomime, explained with music, in which commonly the old story of love and its troubles is related.

BAYAGOULAS, an Indian tribe, of Choctaw affinity, on the Mississippi, who with the Mongoulachas were also known by the name of Quinipissas. They are noticed by early writers for their strange temple in which divine honors were paid to the opossum. They were friendly to the French, and the missionary Limoges labored among them, but without fruit, as they seem to have been cruel and treacherous. Tonti in 1685, looking for La Salle, left a letter for him at the village of this tribe, where Iberville found it in 1699. Before the Natchez war they had merged in other tribes.

BAYAMO, an inland town of Cuba, in the Eastern department, capital of a district of the same name, situated in a plain on a tributary of the river Cauto, 96 m. S. E. of Puerto Principe; pop. previous to the civil war, which commenced in 1868, about 18,000. It is in the main badly built. It has a trade through the Cauto with the ports of Manzanillo on the southwest and Holguin on the northeast. The chief productions of the district are horses and horned cattle, which are largely raised.

BAYARD. I. James Asheton, an American lawyer and statesman, born in Philadelphia, July 28, 1767, died in Wilmington, Del., Aug. 6, 1815. His ancestor, Nicholas Bayard, a French Huguenot, arrived in this country in 1647 in company with his brother-in-law Peter Stuyvesant, the last Dutch governor of New York. James Bayard was educated at Princeton college, studied law in Philadelphia, began practice in Delaware, and in 1796 was elected to congress as a supporter of the federal administration. In 1801 he was appointed by President Adams minister to France, but declined. He was a leader in the policy which resulted in the election of Mr. Jefferson as president by the house in 1801, and in 1804 was chosen United States senator as successor of his father-in-law Gov. Bassett, and remained there until selected by Mr. Madison as one of the commissioners for negotiating the treaty of Ghent in 1813. He took a prominent share in the negotiations, and after the ratification of the treaty was appointed envoy to Russia, but refused the appointment. **II. Richard Bassett,** son of the preceding, born in Wilmington, Del., in 1796, died in Philadelphia, March 4, 1868. He was United States senator from 1836 to 1839, and again from 1841 to 1845. **III. James Asheton,** brother of the preceding, was elected senator from Delaware in 1851, 1857, 1863, and 1869. He was an able lawyer, and for several years was chairman of the judiciary committee. He resigned owing to ill health in 1869. **IV. Thomas Francis,** son of the preceding, born at Wilmington, Oct. 29, 1828, succeeded his father as senator from Delaware in 1869.

BAYARD, Jean François Alfred, a French dramatist, born in Charolles, department of Saône-

et-Loire, March 17, 1796, died Feb. 20, 1853. In 1821 he wrote *Une promenade à Vaucluse*, which was successfully performed at the vaudeville theatre. It was followed by *La reine de seize ans*, brought out at the *Gymnase*, and received with great favor. Bayard united his labors in many instances to those of Mélesville, Carmouche, Dumanoir, and Scribe, whose niece he married in 1827. He was the author of over 200 plays. A complete edition of his works, in 8 vols., containing a memoir written by Scribe, was brought out at Paris in 1856.

BAYARD, Pierre du Terrail, chevalier de, a French knight, born at the château de Bayard, in Dauphiny, in 1475, died in Italy, April 30, 1524. He came of a martial family: his great-great-grandfather was killed at Poitiers, his great-grandfather at Crécy, his grandfather at Montlhéry, and his father received many wounds in the wars of Louis XI. As page to the duke of Savoy and in the household of Paul of Luxemburg, count de Ligny, he received while young his education in horsemanship, feats of arms, and rules of chivalry. At the age of 18 he entered the service of Charles VIII. and accompanied him in his expedition to Naples in 1494–'5, during which he distinguished himself by capturing a stand of colors in the battle of Fornovo. In the Italian wars of Louis XII. he displayed great courage, especially at the siege of Milan (1499), where in the eagerness of pursuit he was carried by the press of fugitives inside the gates, but was liberated with horse and armor, without ransom, by Ludovico Sforza. On one occasion he alone defended a bridge over the Garigliano against 200 Spaniards until the French army had effected its retreat. He was wounded in the assault of Brescia, and carried to a house in the town, where in his disabled condition he defended the ladies of the household against the brutality of the soldiery. For this service his hostess prevailed upon him to accept 2,000 pistoles, which he at once bestowed upon her two daughters as marriage portions. In the war with the English king Henry VIII. at Térouanne and Tournay, Bayard struggled bravely to sustain the failing fortunes of Louis XII. In the "battle of the spurs" at Guinegate, Aug. 16, 1513, he with 14 men-at-arms held the English army in check, while the French, who were retreating panic-stricken, reassembled. Bayard with an advance force preceded Francis I. on his expedition into Italy to regain Milan and other conquests of his predecessors; he captured Prospero Colonna, who had formed an ambush for the French, and on Sept. 13 and 14, 1515, gained the battle of Marignano, during which he performed such feats of valor that at the close of the contest Francis asked to be knighted by his hands. In 1522, with a force of 1,000 men, he defended the unfortified frontier town of Mézières for six weeks against the invading army of the count of Nassau, which numbered 35,000 and was aided by strong artillery. For this service Bayard received the collar of St. Michael, and was made a commander of 100 men-at-arms—a position until then never held except by princes of the blood royal. In 1524 he was summoned from Dauphiny, over which he had been made lieutenant general, and given a subordinate command in the army of Bonnivet, which Francis I. sent into Italy to act against the constable de Bourbon. Bonnivet was obliged to retreat, and being wounded committed the army to Bayard, who succeeded for a while in checking the enemy. While fighting in a ravine near the banks of the Sesia he was struck by a stone from an arquebuse, taken from his horse, and at his own request left seated against a tree with his face to the advancing enemy, among whom he died after having confessed his sins to his squire. With his fall the battle ended; the French lost standards, ordnance, and baggage, and their retreat became a disorderly flight. Bayard was the last, as he was the best, example of the institution of knight errantry. He lived at a time when the strict laws of chivalry were becoming greatly relaxed, and when knights were assuming the vices as well as the profession of mere soldiers of fortune. For this reason his loyalty, purity, and scrupulous honor gained for him the more universal admiration, and the titles of "the good knight" and the *chevalier sans peur et sans reproche*. According to original signatures of his preserved in the national library, Paris, the name should be spelled Bayart.

BAYBERRY, or **Wax Myrtle** (*myrica cerifera*, Linn.), a low, crooked shrub, 3 to 8 feet high, growing in extensive patches or in thick clusters on every variety of soil, usually near the seacoast, throughout the United States. The bayberry is typical of the natural order *myricaceæ* of Lindley, related to the birches, but distinguished chiefly by the 1-celled ovary, with a single erect, straight ovule, and the drupe-like nut. This order embraces three or four genera, shrubs or small trees covered with resinous dots and glands, and alternate, simple leaves, with or without stipules, indigenous to North and South America, the Cape of Good Hope, and India. Their flowers are dicœcious, amentacious, naked; the stamens 2 to 8, generally in the axil of a scaly bract; anthers 2 to 4-celled, opening lengthwise; ovary 1-celled, ovule solitary; stigmas 2, subulate or else petaloid; fruit drupaceous; seeds solitary, erect, the embryo exalbuminous. The bayberry has an irregular, crooked, seldom erect stem, which gives off rough branches in clusters; the bark brownish gray, sprinkled with round or oblong white dots; the leaves irregularly scattered, often in tufts, nearly sessile, obovate lance-shaped, abruptly pointed, cuneate at base, wavy, slightly serrate and revolute at the edge, yellowish beneath. The flowers appear in April and May, the barren ones in short, stiff, erect catkins, having loose, rhomboidal scales containing each 3 or 4 stamens; the fertile flowers are much smaller and occur on a dif-

ferent plant, the scales imbricated, oval, pointed, each containing an ovary with 2 subulate stigmas. The fertile ament ripens into a branch of 4 to 9 dry berries, which are covered with rounded waxy particles, giving out, as well as

Bayberry (Myrica cerifera).

the entire plant, a fragrant and balsamic odor. This species is especially prized for its wax (see WAX), but seems to be held in more esteem in Europe than in America; and in certain parts of France it has become perfectly acclimated.—Other species of *myrica* are known as the fragrant gales, of which a familiar example is *M. gale* (Linn.), a dark-colored bush 2 to 5 feet high, having wedge or lance-shaped, scarcely serrated, fragrant leaves, and stiff brown-scaled aments appearing in April, and found in inundated places. A southern species, (*M. inodora*, Bartram), a shrub with whitish bark and perennial, coriaceous, oblong, obtuse, entire leaves, sparingly dotted, is found on the margin of swamps near the seacoast of Florida. The sweet fern (*Comptonia asplenifolia*, Aiton), a very common plant in old and neglected pastures throughout the United States, also belongs to the order *myricaceæ*.—The medicinal qualities of the order are astringent and tonic, as in the sweet fern, which is employed in diarrhœa, while in its aromatic bark reside both benzoic and tannic acids combined with a resinous matter. The roots of the bayberry are reputed emetic and drastic. The sweet gale has been used as a vermifuge, and its leaves employed in brewing; it affords a yellow dye, and its stems and branches are used in tanning.

BAY CITY, a city of Michigan, capital of Bay county, on the E. side of Saginaw river, near its mouth in Saginaw bay, a part of Lake Huron; pop. in 1860, 1,583; in 1870, 7,064. The city has 9 churches, of which 2 are German, 6 school houses, 2 large hotels, and 1 daily and 2 weekly newspapers. Within its limits are 16 saw mills, which produce daily about 1,000,000 ft. of lumber. Most of these have salt wells and salt factories attached to them, which produce annually from 80,000 to 100,000 barrels of salt. The annual export of lake fish, white fish, trout, pike, and herring is from 50,000 to 60,000 barrels. There is also a large manufactory of gas and water pipes, and one of buckets. Six lines of passenger steamboats and more than 1,000 vessels touch at the port; and there is railroad communication with Detroit, Jackson, and Chicago. Bay City was first settled in 1836, was incorporated as a village in 1859, and as a city in 1865.

BAYER, Johann, a German astronomer, born in Bavaria about 1572, died in Augsburg about 1660. He was a Protestant preacher, so distinguished for ability that he was called *Os Protestantium*. His principal work is *Uranometria* (fol., Augsburg, 1603), afterward enlarged under the title of *Cœlum Stellatum Christianum* (1627; new ed., Ulm, 1723), with an astronomical atlas of 51 plates, in which the stars of each constellation were for the first time designated by the first letters of the Greek alphabet.—His grandson, GOTTLIEB SIEGFRIED (born in 1694, died in 1738), was professor of Greek and Roman antiquities at St. Petersburg, and author of *Museum Sinicum*, containing a Chinese grammar, &c., and of various other philological and archæological works.

BAYEUX (anc. *Bajocai*, or *Civitas Bajocassium*), a town of Normandy, France, in the department of Calvados, on the river Aure, 5 m. from the sea, and 15 m. N. W. of Caen; pop. in 1866, 9,138. It has a commercial college, a public library, a Gothic cathedral, extensive manufactories of lace, damasks, calico, serges, cotton yarn, a large porcelain factory, paper mills, many tanneries, and dyeing and printing establishments, and an important trade in butter. During the wars between the dukes of Normandy and the kings of England with the kings of France, it often changed masters. It was captured by Henry I. in 1106, by Philip of Navarre in 1356, and finally retaken from the English by Dunois in 1450. During the religious wars it was alternately in the possession of the Huguenots and the league.

BAYEUX TAPESTRY, a piece of pictorial needlework, supposed to have been done by Matilda, wife of William the Conqueror, and the ladies of her court, representing the events connected with the conquest of England. It is worked like a sampler in woollen thread of different colors, is 20 inches wide and 214 feet long, and has 72 divisions, each with a Latin inscription designating its subject. It is of great historical value, since it not only exhibits with minuteness Norman customs and manners at the time of the conquest, but pictures events of which no other record exists—among others, the siege of Dinan and the war between the duke of Normandy and Conan, earl of Brittany. It remained in the cathedral of Bayeux, in Normandy, for which it was probably wrought, till 1803, when by order of Napoleon it was taken

to Paris, where it was exhibited at the national museum, and thence to other large towns in France. It was then deposited in the town hall of Bayeux, where it now remains, preserved under glass in the public library.

BAYFIELD, a N. W. county of Wisconsin, on Lake Superior, including a number of islands in the lake; area, about 1,450 sq. m.; pop. in 1870, 344. Capital, Bayfield.

BAYLE, Pierre, a French philosophical writer, born at Carla, in the county of Foix, Nov. 18, 1647, died in Holland, Dec. 28, 1706. He was the son of a Protestant clergyman, and was educated at the university of Puylaurens and by the Jesuits of Toulouse, under whose influence he renounced Protestantism; but he soon recanted, and to avoid persecution took refuge in Geneva, where he became acquainted with the Cartesian philosophy. He wished to devote himself to science; but being poor, he served as a tutor in several families. Returning to France, he became professor of philosophy in the Protestant university at Sedan in 1675. There he wrote an anonymous pamphlet in defence of the duke of Luxemburg, who was charged before a high court of councillors of state with having made a compact and holding regular intercourse with the devil; and soon afterward published his *Cogitationes rationales de Deo, Anima et Malo*, in opposition to the doctrines of Poiret. In 1681 the university of Sedan was suppressed by Louis XIV., and Bayle with the other professors removed to Rotterdam, where he continued his professorship. His *Pensées sur la comète*, published there in 1682, to allay the fears revived among the people on the appearance of the comet of 1680, was prohibited in France by the police, but eagerly read. His pamphlet in reply to the *Histoire du Calvinisme* of the Jesuit Maimbourg was also very successful, and was ordered to be publicly burned by the executioner. In 1684 Bayle commenced a literary journal, under the title of *Nouvelles de la république des lettres*, which was popular, but led to many quarrels. On the occasion of the severe measures of Louis XIV. against the Protestants, he wrote a plea for toleration entitled *Commentaire philosophique sur les paroles de l'Évangile: "Contrains-les d'entrer."* For this Jurieu, the jealous author of a rival and unsuccessful answer to Maimbourg, denounced him as indifferent to religion, in fact almost an infidel, and finally had him dismissed from his professorship, deprived of his pension, and at last in 1693 forbidden by the common council of Rotterdam to teach either publicly or privately. Bayle then began his famous and long projected *Dictionnaire historique et critique*, in which he intended to point out the errors and supply the deficiencies of the most important publications of the same kind. In 1696 the first edition appeared (2 vols. folio, Rotterdam), and had at once an immense success. His enemies, however, arraigned him before the consistory of the Walloon church, who ordered him to make many corrections and alterations in various important articles. The controversy in this matter occupied much of his time, and prevented him from improving as completely as he wished the work to which he had devoted his life. Bayle has been called the Montaigne of the 17th century; but, with a similar tendency to skepticism and greater earnestness, he lacks the ease and grace of that writer. He published the second edition of his *Dictionnaire* in 1702, but the most valuable editions are those of 1740, at Basel and Amsterdam, both in 4 vols. folio. The English edition by Thomas Birch and Lockman (10 vols. folio, London, 1734–'41), contains many additions. The most recent is that of Beuchot (16 vols. 8vo, Paris, 1820).

BAYLEN, or **Bailen,** a town of Spain, in the province of Jaen, situated at the foot of the Sierra Morena, 22 m. N. of Jaen; pop. about 7,900. It commands the road from Castile into Andalusia. In the peninsular war the French general Dupont, while attempting to cross the Sierra at this point, was surrounded by the Spaniards and surrendered to Castaños, July 20, 1808, with about 18,000 troops.

BAYLEY, James Rooseyelt, an American archbishop, grandson of Richard Bayley, M. D., born in New York, Aug. 23, 1814. He is a graduate of Washington (now Trinity) college, Hartford, and was for some time tutor there. He studied theology with Dr. Samuel Farmer Jarvis of Middletown, Conn., was ordained a minister of the Protestant Episcopal church, and preached at Harlem, N. Y., and afterward at Hagerstown, Md. He then joined the Roman Catholic church, prepared himself for the priesthood at St. Sulpice in Paris, and was ordained in New York, March 2, 1842, by Bishop Hughes. He was appointed professor of belles-lettres at St. John's college, Fordham, N. Y., of which he was president in 1845–'6, and from 1846 to 1853 was secretary to Archbishop Hughes. On Oct. 30, 1853, he was consecrated first bishop of Newark, N. J., which under his administration became one of the most prosperous dioceses in the United States. He founded Seton Hall college and numerous schools, academies, convents, and churches. On July 30, 1872, he was appointed archbishop of Baltimore. He has published a "Sketch of the History of the Catholic Church on the Island of New York" (New York, 1853; revised ed., 1869); "Memoirs of Simon Gabriel Bruté, first Bishop of Vincennes" (1860); and "Pastorals for the People."

BAYLEY, Richard, an American physician, born at Fairfield, Conn., in 1745, died Aug. 17, 1801. He studied in the hospitals of London, and in 1772 returned to New York and commenced practice, becoming especially distinguished in the treatment of croup. In 1775 he revisited England, but in the spring of 1776 returned to New York as staff surgeon to Sir Guy Carleton. He resigned his commission in the army the next year and resumed prac-

tice in New York. His letters to Dr. Hunter upon the croup were published in 1781. In 1787 he gave lectures upon surgery. The next year his collection of specimens of morbid anatomy was totally destroyed by the "doctors' mob." In 1792 he was professor of anatomy in Columbia college, and afterward of surgery. He was the first health officer of New York, and in 1797 published an essay, and afterward a series of letters, on the yellow fever then prevailing, attributing it entirely to local causes, and repudiating the theory of contagion. He exerted himself to obtain the passage of proper quarantine laws, in which he was finally successful. He died of ship fever contracted in the discharge of his official duties. His daughter, Mrs. Seton, founded the Sisterhood of Charity in the United States. (See SETON, ELIZA ANN.)

BAYLOR, an unsettled N. W. county of Texas, watered by the Big Wichita, the main or Salt fork of the Brazos river, and Antelope creek; area, 900 sq. m. The surface is mostly high, broken, and rocky; between the Brazos and Big Wichita it is mountainous. The bottom lands of the Brazos are rich.

BAYLY, Thomas Haynes, an English poet and dramatist, born near Bath, Oct. 13, 1797, died April 22, 1839. For a time he was a student at Oxford, with the intention of taking holy orders; but inheriting a fortune from his father, who was an eminent solicitor, he was prominent in fashionable society in Bath and London. In 1831 he met with a pecuniary reverse which compelled him to turn to account his talent for music and song-writing, and his general literary abilities, which had long before attracted favorable attention. His "Melodies of Various Nations," with musical accompaniments arranged and composed by himself and Sir Henry Bishop, appeared in 1832, and attained an immediate success. In a very few years he wrote 36 pieces for the stage, several novels and tales, and hundreds of songs. Among his best known songs are: "We met, 'twas in a crowd," "The Soldier's Tear," "Oh no, we never mention her," "Why don't the men propose?" and "I'd be a butterfly." His literary works are: "Aylmers," a novel; "Kindness in Women," a collection of tales in 3 vols.; "Parliamentary Letters and other Poems;" "Rough Sketches of Bath;" and "Weeds of Witchery," a volume of poems. After his death his widow published 2 vols. of his poems, with a biography.

BAYNE, Peter, a Scottish author and critic, born in Aberdeenshire in 1829. He was educated at Marischal college, Aberdeen, and afterward studied theology at Edinburgh, and philosophy under Sir William Hamilton. In 1851–'2 he contributed to "Hogg's Instructor" a series of critical essays on De Quincey, Alison, Hugh Miller, and others, which attracted marked attention, and were especially commended by De Quincey and Alison. Their success determined him to devote himself to literary life, and in 1855 he published "The Christian Life, Social and Individual," in which Hugh Miller said some of the biographies "condense in comparatively brief space the thinking of ordinary volumes." This work was immediately republished in Boston, and was followed by a collection of the essays from "Hogg's Instructor," with several new ones written for this edition, under the title of "Essays in Biography and Criticism" (2 vols., Boston, 1857–'8). In 1855 he was editor-in-chief of a Glasgow newspaper, "The Commonwealth;" but in 1856 he resigned and visited Germany for health and study. After his arrival in Berlin he was appointed to succeed Hugh Miller as editor of the Edinburgh "Witness," but did not assume that position till the summer of 1857, meantime pursuing his German studies and marrying a daughter of Gen. Gerwien of the Prussian army. He has since published in the "Witness" several extended essays and criticisms, particularly a series in defence of Hugh Miller's "Testimony of the Rocks" against an attack in the "North British Review," and these have been issued in a pamphlet edition. He has also published "Testimony of Christ and Christianity" (reprinted in Boston, 1862), and "The Days of Jezebel," a historical drama (Boston, 1872).

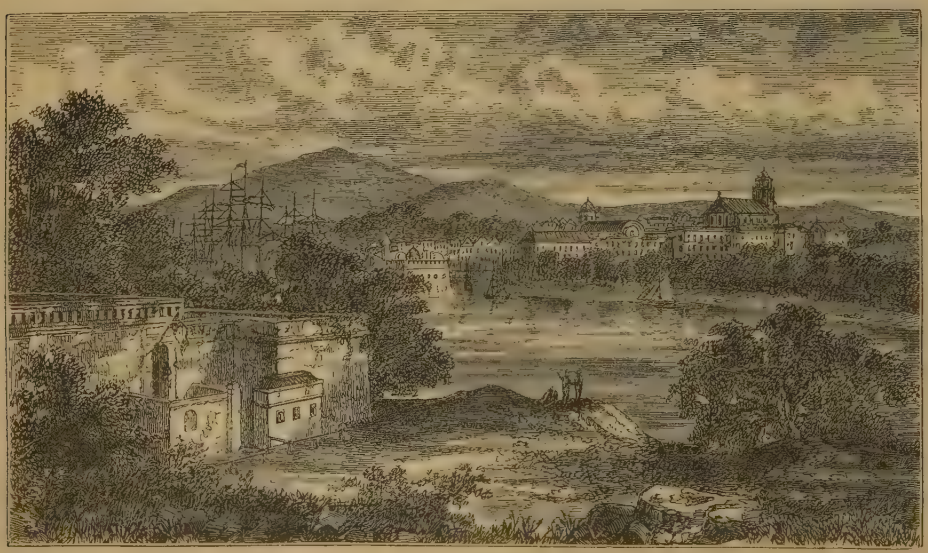
BAYONET, a sword-like blade adapted to be affixed to the muzzle of a musket or rifle and used by infantry. It was invented in France (at or near Bayonne, whence the name) about the year 1640. Up to that time the musketeers were mixed with pikemen to protect them from a closing enemy. The bayonet enabled musketeers to withstand cavalry or pikemen, and thus gradually superseded the pike. Originally the bayonet was fastened to a stick for insertion into the barrel of the musket; the socket bayonet, fastened by a tube passing round the barrel, was a later invention. The French did not do away entirely with the pike till 1703, nor the Russians till 1721. At the battle of Spire, in 1703, charges of infantry were first made with fixed bayonets. The bayonet has been variously modified in form, the better to adapt it to its original purpose or to collateral uses. Among recent improvements is the trowel or spade bayonet, calculated both for offensive use and for digging intrenchments.

BAYONNE (Basque, *baia ona*, good bay), a city of S. W. France, department of Basses-Pyrénées, at the confluence of the Nive with the Adour, 2½ m. from the bay of Biscay, 18 m. from the Spanish frontier, and 113 m. S. S. W. of Bordeaux; pop. in 1866, 26,333. It is separated into three parts, Great and Little Bayonne and the suburb of Pont St. Esprit, which is on the opposite side of the Adour, and is inhabited mainly by Jews, descendants of fugitives from Spain. Bayonne is strongly fortified, has one of the finest arsenals in France, handsome quays and promenades, a mint, a theatre, a seminary, schools of commerce, naval

and commercial docks, chamber and tribunal of commerce, distilleries, sugar refineries, and glass works. It has a considerable trade with Spain, and exports timber, tar, corks, hams, chocolate, liqueurs, and cream of tartar. It has a cathedral of the 12th century, and a citadel built by Vauban. Bayonne is supposed to occupy the site of an ancient town named Lapurdum. Though it has been besieged many times, it has never been captured, wherefore the inhabitants call it the virgin city. In the middle ages it was long held by the English with Aquitaine, but was surrendered to Charles VII. in 1451. It was here that the notorious convention between Napoleon and the court of Spain was held in April and May, 1808, in which the emperor by persuasion and threats extorted from Ferdinand VII. the retrocession of the Spanish crown to his father Charles IV., and from the latter (May 5) an abdication in favor of a successor to be chosen by Napoleon. This successor was his brother Joseph.

BAYOU SARA, a village of West Feliciana parish, La., situated on the Mississippi river, 165 m. above New Orleans; pop. in 1870, 440. It is an important shipping point for corn and cotton. A railroad connects it with Woodville, Mississippi.

BAYRHOFFER, Karl Theodor, a German philosopher and politician, born in Marburg in 1812. He studied law, but devoted himself subsequently to philosophy, on which subject he began to lecture in 1834 in Marburg, where in 1838 he received the appointment of special and in 1845 of permanent professor at the university. He advocated the views of Hegel, and in 1849 published in the *Jahrbücher für Wissenschaft und Leben* a series of papers un-



Bayonne.

der the name of *Untersuchungen über Wesen, Geschichte und Kritik der Religion*, in elucidation of his views of the Marburg *Lichtfreunde*, and of the other new religious organization which grew out of the German Catholic movement. He took a prominent part in the revolutionary movements of 1848, and in November of that year was made a member of the diet of Hesse-Cassel, in which body he was the leader of the democratic party, and for a short time president of the chamber; but after the defeat of the democratic party he went to Paris and afterward to America.

BAZA (anc. *Basti*), a town of Spain, in the province and 51 m. E. N. E. of the city of Granada; pop. about 9,000. It is situated in a high valley near the river Baza, between the Sierras de Baza and de Javalcol, and has a suburb chiefly consisting of caverns. In the Gothic collegiate church is the tomb of its patron saint, Maximus; and there are several other fine churches and convents. The women of Baza are celebrated for their beauty and picturesque costume. The occupation of the inhabitants is mainly agricultural. A rich red wine is produced in the vicinity and mixed with *aguardiente* distilled from aniseed. Remains of antiquity abound in this region. The town was called Bastiana in the middle ages and Bastah by the Moors, who captured it early in the 8th century, and under whom it became one of the most flourishing commercial emporiums of Andalusia, with a population of 50,000. It was taken from them in 1489 by the Spaniards commanded by Queen Isabella in person, after a siege of seven months. Some of the rude cannon used by the Moors are still preserved here. In August, 1810, Soult de-

feated over 20,000 Spaniards on the plain of Baza. The hot sulphur springs of Bensalema, near Zujar, at the foot of the Javalcol mountain, are often called the springs of Baza.

BAZAINE, François Achille, a French general, born in Versailles, Feb. 13, 1811. He enlisted as a private in 1831, became a lieutenant in Algeria in 1835, captain after two years' service with the foreign legion against the Carlists in Spain, lieutenant colonel in 1848 after nine years' active duties in Algeria and Morocco, colonel of the foreign legion in 1850, and general of brigade in the Crimean war, acting as commander of Sebastopol after its capture. He acquired the rank of general of division in 1855, and participated in the capture of Kinburn. Subsequently he held the post of military inspector in France. In the Italian campaign he was wounded, June 8, 1859, while commanding a division in the attack upon Melegnano, and he took a conspicuous part in the battle of Solferino. In 1862 he commanded in Mexico the first division of the French army, and by defeating Comonfort compelled the surrender of Puebla, May 18, 1863, shortly after which the French entered the capital. On Oct. 1, 1863, he succeeded Forey as commander-in-chief, acting also as civil administrator of the occupied districts; and the rank of marshal was conferred on him in 1864. In February, 1865, he captured the town of Oajaca, together with a Mexican army of 7,000 men under Diaz. Though he persuaded Maximilian to issue the most rigorous decrees against the Juarists, and himself relentlessly executed them, he was generally believed to be engaged in secret plottings with the enemies of that emperor, in pursuance of personal ambitious schemes. He married a rich Mexican lady whose family sided with Juarez. In February, 1867, he withdrew with his forces from the capital, declaring Maximilian's position to be untenable, and soon afterward embarked at Vera Cruz. On his arrival in France, though exposed to violent public denunciations, he took his seat in the senate, and was appointed commander of the 3d army corps; and in October, 1869, after the death of St. Jean d'Angely, he became commander-in-chief of the imperial guard at Paris. On the outbreak of the Franco-German war in 1870 he was placed in command near Metz of the 3d corps, consisting of four divisions of infantry, one of cavalry, and a strong force of artillery. After the defeats of Wörth and Forbach, he assumed on Aug. 8 the command of the main French armies, in place of the emperor Napoleon, and began his retreat from Metz Aug. 14, hoping to effect a junction with the army near Châlons and with the new forces gathering under MacMahon. But he was attacked on the same day, when still in front of the fortress, and after the succeeding bloody battles of Mars-la-Tour (Aug. 16) and Gravelotte (Aug. 18) was forced to retire within the fortifications, and soon after hermetically shut in by Prince Frederick Charles. He made several futile attempts to break through the investing army, that of Aug. 31 to Sept. 1 proving very disastrous. After the capitulation at Sedan he renewed these attempts (Oct. 7, 8) to escape from Metz, and then tried to negotiate with the Germans at Versailles through his adjutant, Gen. Boyer, and in the interest, it was thought, of the deposed dynasty; but he was compelled on Oct. 27 to surrender to Prince Frederick Charles with his entire force of 173,000 men, including 3 marshals, 3 commanders of corps, 40 generals of divisions, 100 brigadier generals, and 6,000 other officers, who by the terms of the capitulation all became prisoners of war, Bazaine himself being permitted to join the ex-emperor at Cassel. After the preliminary treaty of peace he removed to Geneva in March, 1871. Having been charged with treason by Gambetta, he defended himself in his *Rapport sommaire sur les opérations de l'armée du Rhin du* 13 *août au* 29 *octobre.* He was placed under arrest May 14, 1872, but his trial had not taken place up to June, 1873.

BAZALGETTE, Joseph William, an English civil engineer, of French extraction, born in 1819. He studied in London under Sir John McNeil, and eventually became engineer to the metropolitan commission of sewers, and engineer-in-chief to the metropolitan board of works. He executed the main drainage works of London, and planned the improved drainage of many localities at home and abroad. Among his great achievements are the works connected with the Thames embankment.

BAZANCOURT, César de, baron, a French writer, born in 1810, died in Paris, Jan. 25, 1865. Under Louis Philippe he was director of the library at Compiègne, and wrote numerous novels and a "History of Sicily under Norman Domination" (2 vols., 1846). Under Napoleon III. he became the official historian of the Crimean and Italian campaigns. His works on those subjects (each 2 vols., 1857 and 1859–'60) passed through many editions. He also wrote a history of the French expeditions to China and Cochin China (2 vols., 1861–'2), and a work on fencing (*Les secrets de l'épée*, 1861).

BAZARD, Amand, a French carbonarist and St. Simonian, born in Paris, Sept. 19, 1791, died at Courtray, July 29, 1832. In 1818 he became the principal editor of *L'Aristarque*, an opposition journal. When, on the assassination of the duke of Berry in 1820, the freedom of the press was restricted, he published many pamphlets to diffuse liberal opinions among the people; and at the same time he founded the lodge of *les amis de la vérité*, pursuing his political purposes under the cover of freemasonry. Aided by Dugied and Joubert, he organized carbonari societies, which soon numbered 200,000 members. He took part in the many conspiracies which tended to the overthrow of the Bourbon monarchy. On the discovery of the Béford military plot he was outlawed, but escaped. He afterward became one of the first disciples of St. Simon, and in 1825 one of the

contributors to the *Producteur*. In 1828, when the St. Simonians commenced expounding their doctrines in public meetings, Bazard was with Enfantin their acknowledged head. He wished to confine the doctrines to strictly philosophical theory, and quarrelled with Enfantin, who proposed to convert them into a religious creed rejecting the ties of marriage. In 1831 he published a manifesto charging Enfantin and his followers with planning a new social order founded upon corruption, licentiousness, and bad faith. He at the same time proclaimed himself chief of the new St. Simonian hierarchy; but the great majority of the St. Simonians adhered to Enfantin.

BAZEILLES, a village of France, in the department of Ardennes, at the confluence of the Chiers and the Givonne, half a mile from the Meuse, and 2 m. S. of Sedan; pop. in 1866, 2,048. It had cloth manufactories and iron works. At the beginning of the battle of Sedan (Sept. 1, 1870) the village was wholly destroyed by the Bavarians, who charged the inhabitants with having fired from their houses on the wounded Germans and the physicians. In 1872 it was already in great part restored.

BAZIN. I. Antoine Pierre Ernest, a French physician, born at St. Brice, Feb. 20, 1807. Like many of his ancestors, he early adopted the medical profession, and has been since 1847 physician of the hospital of St. Louis and professor of dermatology. His principal works relate to diseases of the skin and to syphilis, and a second edition of his *Leçons théoriques et cliniques sur la syphilis et les syphilides* was published in 1867. **II. Antoine Pierre Louis,** a French philologist, brother of the preceding, born March 26, 1799, died in January, 1863. He was professor of Chinese, translated many works from that language, and in 1856 published *Grammaire mandarine, ou principes généraux de la langue chinoise parlée.*

BDELLIUM, a gum resin obtained from the *amyris commiphora* of India and Madagascar, and the Senegal variety from the *Heudelotia Africana*. Its color is brownish red. The fracture is dull and wax-like. It burns with a balsamic odor, and resembles myrrh in taste, smell, and medicinal properties. It is sometimes, but rarely, used for plasters, and is also administered internally.

BEACH, Moses Yale, an American mechanic and editor, born at Wallingford, Conn., Jan. 7, 1800, died there, July 19, 1868. At the age of 14 he was apprenticed to a cabinet-maker at Hartford, but purchased his freedom in his 18th year. After failing in the cabinet business at Northampton, Mass., he removed to Springfield and endeavored to manufacture a gunpowder engine for propelling balloons. The attempt was unsuccessful. He next undertook to open steam navigation on the Connecticut river between Hartford and Springfield, but the ruinous state of his affairs obliged him to cease operations while his steamer was on the stocks. Mr. Beach soon after devised a rag-cutting machine, which was adopted in paper mills. He next removed to Ulster county, N. Y., where he became concerned in an extensive paper mill. In 1835 he acquired an interest in the "Sun" newspaper in New York, the pioneer of the penny press, of which he soon made himself sole proprietor. In 1857 he retired from business and took up his residence in Wallingford.

BEACONSFIELD, a market town of Buckinghamshire, England, 23 m. W. by N. of London; pop. in 1871, 2,926. It is situated on high ground, where once there was a beacon. The remains of Edmund Burke are deposited in the parish church; and the churchyard contains a monument to the poet Waller, who owned the manor. Beaconsfield gave the title of viscountess to the wife of Benjamin Disraeli.

BEAD (A. S. *bead*, prayer; Dan. *bede*, to pray), a small perforated body, usually globular, made of various materials, and used as an ornament or to number prayers. Beads are worn in the form of a chain by stringing them together. The wearing of beads for ornaments is of very great antiquity. The Egyptians, besides wearing them, adorned their mummies with them. The Egyptians, and probably the Phœnicians, made glass beads more than 3,000 years ago. The Old Testament often refers to the wearing of beads, as in Canticles: "Thy cheeks are comely with rows of jewels, thy neck with chains of gold," chains in this passage signifying perforated articles. Beads made of marine shells were used from remote traditional times by the New England Indians as a currency, under the name of *wampum*, and were also worn in a belt, called *wampumpaque*. Schoolcraft gives an interesting account of the discovery of beads of various forms and materials in Isle Ronde, Lake Huron. Necklaces and bracelets made of beads of metals, shells, teeth, coral, seeds of plants, and other materials, are described by nearly all travellers among primitive peoples. Beads, principally of glass, but of other materials also, are in common use among the tribes of Africa as a currency, and are carried there in great quantities by travellers. In the Roman Catholic church, beads, in the form of chaplets, are used in saying the rosary, a series of prayers to the Blessed Virgin. "St. Cuthbert's beads" was the name given to a chaplet of beads made from the joints of the stems of fossil encrinites. (See ROSARY.) The worshippers of the grand lama use a string of beads in their religious ceremonies. The Chinese chaplet contains 108 beads, and is worn as a necklace; some of the beads denote the rank of the wearer. The Mohammedans use a chaplet of beads, which they count with their fingers while reciting the 99 qualities of God mentioned in the Koran.—Murano, a small island near Venice, and Birmingham, England, are the principal seats of the manufacture of glass beads. They are made from tubes, which are cut into pieces of the desired length, the sharp edges being then rounded by fusing, either with the blowpipe or by the application

of heat in some other mode. At Murano a mixture of fine sand and charcoal, to prevent the pieces from fusing together, is stirred with them, when they are agitated in a red-hot iron pan which rounds them. The core of sand is then easily removed.

BEAGLE, a small, well proportioned hound, not more than 10 or 11 inches in height at the shoulder, with long pendulous ears, smooth hair, and color either black or dark brown with white spots, or pure white, or white with black and tan ears and eye patches. By careful breeding the animal has been reduced in size, and the smallest are known as lapdog beagles. It

Beagle.

is distinguished for its fine scent and perseverance. Formerly it was a favorite in England for hare hunting; its small size and slow but sure movements prolonged the pleasure of the chase, and, though distanced at first, its perseverance made it sure of killing the hare at last. The chase with beagles could be followed on foot. In this sport, however, the beagle is now almost entirely superseded by the harrier.

BEALE, Lionel S., an English physiologist, born in London about 1825. He graduated at the university of London in 1851, and is professor of general physiology and morbid anatomy at King's college. He established in 1857 the "Archives of Medicine," contributed actively to the "Lancet" and other periodicals, and has written "How to Work with the Microscope" (3d ed., 1866); "Microscopism in its Application to Medicine" (3d ed., 1867); "Kidney Diseases, Urinary Deposits, &c." (3d ed. enlarged, 1868); "Protoplasm, or Life, Matter, and Mind" (enlarged ed., 1870); "Diseased Germs, their Supposed Nature" (1870); "Physiological Anatomy;" "Anatomy of Man," &c.

BEALE, Mary, an English artist, born in Suffolk in 1632, died Dec. 28, 1697. She became noted as a portrait painter in 1672, for the beauty of her coloring, which she had attained by copying the paintings of Correggio, Vandyke, and others. She studied with Sir Peter Lely, and painted the portraits of the bishop of Chester, the earl of Clarendon, and other distinguished persons. She worked in oils, water colors, and crayons, and received large prices for her pictures. Her husband was a painter and color-maker, but had no reputation as an artist. Mrs. Beale was well educated, and wrote some poetical pieces.

BEAM (Sax. *beam*, a tree), in architecture, a piece of timber or iron, long in proportion to its breadth and thickness, used either to support a superincumbent weight, or to bind together the parts of a frame as a tie, by resistance to extension, or to hold them apart as a strut, by resistance to compression. The term is applied particularly to the largest piece of timber in a building, that which lies across the walls and supports the principal rafters. Important improvements have been introduced within a few years, in various departments of practical construction, by the use of iron beams, especially in the building of fire-proof structures and bridges. Prior to their introduction the only method of securing safety from fire was by massive and cumbersome constructions of masonry. This system of groined arches involves great loss of room, the most solid foundations and heavy walls and piers to sustain their weight and thrust, and often an inconvenient arrangement and division of the interior of the edifice. It is not only not adapted to the purposes of business, but its expense is such as to preclude its use for ordinary warehouses, offices, and dwellings. The introduction of cast-iron beams and light segmental arches to some extent obviated these inconveniences; but experience has shown that wrought iron is much better adapted to resist transverse strains, and the testimony of eminent engineers and architects is unanimous in preferring it for this purpose, as both more trustworthy and more economical than cast iron. The first instance on record of the construction of a building with cast-iron beams is that of a fire-proof cotton mill erected in Manchester by Boulton and Watt, in 1801. It was not, however, until after the elaborate experiments of Mr. Hodgkinson, in 1830, upon the strength and properties of cast iron, that the best form of section was determined, or that iron beams were used for spans exceeding 14 feet. He found the resistance of cast iron to compression to be about six times as great as its resistance to extension, and that equal strength could be obtained with half the weight of material formerly used, by giving the proper proportions to the parts subjected to these respective strains. Much, however, was still to be desired on the score of security and economy, and numerous accidents have justified the general want of confidence in beams of cast iron, unless great precautions are observed in casting them and properly proportioning their parts; and even when these precautions are observed, and iron of good quality is selected, security can be obtained only by making the most ample allowances for unequal shrinkage in cooling, and for hidden imperfections not apparent on the surface, or to be detected only

by the most careful examination. Other objections to cast-iron beams are, that they are liable to fail without warning, especially if subjected to concussion, and to be broken by the frequent application and removal of loads much less than the permanent load they would sustain with safety. By a system of testing, in some cases, defective beams may be detected; but in others, the load applied in the test itself may so weaken the beam that it may afterward fail with a load much less than that employed in the test, especially if it is to be subjected to concussion or repeated deflections, even though small in amount. The successful construction in 1849 of the tubular bridges over the Conway and Menai straits was one of the earliest applications of wrought-iron beams, and on the most gigantic scale. The laws and the amount of the resistance of wrought iron to the various strains to which it is subjected in its application to beams were first determined by the most careful and elaborate experiments, and the superiority of wrought iron for this purpose clearly demonstrated. By means of the data thus obtained, Mr. Stephenson was enabled successfully to carry out his conception of using for the bridges of the Chester and Holyhead railway tubular beams of sufficient strength and rigidity to permit the passage of the heaviest railway trains at the highest speed. These applications of wrought-iron beams on the grandest scale have been followed by their more modest, but even more useful application to fire-proof buildings, whereby at the same time perfect security and a material reduction in the cost of fire-proof constructions have been attained. Wrought iron is an elastic material of fibrous structure. Its ultimate strength of resistance to extension is greater than to compression; but when these strains do not exceed about one half its ultimate strength, it offers equal resistance to either strain. Within these limits the amount of the extension or compression which it undergoes is about half that of cast iron for equal loads; but the amount of its extension or compression before rupture is much greater than that of cast iron. A wrought-iron beam will thus be more rigid than one of cast iron, with any load that will in practice be permanently applied to it; but, unlike the latter, by its excessive deflection when overloaded, will give warning of danger before rupture can take place. This characteristic is of great importance in beams which may be subjected to impact, as the falling of a heavy weight, the resistance of the beam being in proportion not only to its strength, but also to the amount of deflection that it will undergo before rupture. The various processes of forging, rolling, &c., to which wrought-iron beams are subjected in their manufacture, will cause any serious defect to be detected. They can be used for much greater spans than beams of cast iron, and it is often an important consideration to dispense with columns or division walls, when large rooms are required.—For wrought-iron beams the most advantageous forms are the double-flanged or ⌶ beam, and the box or tubular beam. Unlike those of cast iron, the flanges or horizontal sides are usually of equal area. When lateral deflection cannot take place, there is little difference in respect to strength between these forms, the single vertical web of the one, and the horizontal flanges projecting from it, being respectively the equivalents of the two vertical and of the two horizontal sides of the other. For floor beams the ⌶ form is ordinarily employed. It is not only more economical, but has the great advantage of allowing the material of which the flooring between the beams is formed to rest upon its lower flanges, thus saving space, and surrounding and protecting the beams from the effects of fire. In the tubular beam not only do its upper and lower sides contribute to its lateral stiffness, but the vertical sides resist lateral flexure in proportion to the width of the tube, exactly as the horizontal sides resist vertical flexure in proportion to its depth, while in the ⌶ beam lateral stiffness is due principally to the flanges. A vertical load upon a beam is sustained by the resistance of its fibres to the forces of compression and extension. A body subjected to compression, as a column, if its length be great in comparison with its lateral dimensions, will fail by bending under a load much less than would be required to crush the material if the column were maintained in the direct line of strain. The tendency of a body subject to compression to yield by flexure being in proportion to the square of its length, while the vertical strength of a beam is in inverse proportion to its length simply, it may often happen that the limit of strength of a beam will be not its vertical but its lateral stiffness; and hence in some cases, as for girders without lateral supports, it may be advisable to use the tubular form, while for floor beams which are secured from lateral deflection by the filling in between them, the ⌶ form is preferable. Wrought-iron beams of either form may be made by riveting together plates, angle bars, T bars, or other shapes; the rivets should always be fastened while hot, in order that their contraction in cooling may draw the parts closely together.—The manufacture of solid-rolled beams has effected a further important reduction in the cost of fire-proof construction. This manufacture was first introduced in this country by the Trenton iron company, at their works in Trenton, N. J. These beams have been adopted by the various departments of the government of the United States in the construction of the many custom houses, marine hospitals, and other public buildings erected since their introduction, to the entire exclusion of the system of groined arches and also of riveted beams, except in cases where the latter are used because solid-rolled beams of sufficient size cannot be obtained. This reduction in the cost of construction has also led to the erection of many fire-proof banking houses, warehouses,

manufactories, &c., and the system is rapidly coming into general use. For filling in between the beams for fire-proof floors various systems have been adopted. In France, where fire-proof construction with iron beams is extensively used, the filling in is generally a concrete of refuse materials and plaster of Paris. Beams of the ⌶ form are placed 2½ or 3 feet apart; their ends are built in the walls and secured by anchors; no beams are placed immediately at the walls parallel with the beams. The beam next each wall is connected to it, and each beam connected with the one next adjoining, by inter-ties of round or square iron of about half a square inch in sectional area, and placed 2½ or 3 feet apart; the inter-ties pass through holes near the centre line of the beams, and are provided with a head at one end and riveted up at the other after they are put in; the ends that are built into the walls are bent to form anchors. Smaller rods parallel with the beams, and 7 or 8 inches apart, are suspended from the inter-ties, the ends of the rods being bent up so as to hook over the inter-ties, while the rods themselves are on a level but little above that of the bottom of the beams; or the inter-ties may be supported upon the lower flanges of the beams and be bent up at the ends so as to hook over the upper flanges, and the smaller rods parallel with the beams be laid upon the inter-ties. A flat centring is placed against the bottoms of the beams, and broken bricks or other refuse materials suitable for concrete are put upon the centring; and plaster of Paris being poured in, the whole mass soon becomes sufficiently set to allow the centring to be removed, and the concrete to be sustained by the iron framework between the beams. In some cases the plaster concrete fills up the whole space between the beams, and flooring tiles are laid directly upon it; in others the depth of the concrete is less than that of the beams, and wooden strips are laid across the beams perpendicular to their length, to which ordinary flooring boards are nailed. A finishing coat of plaster put directly on the concrete forms the ceiling below. Hollow potteries placed upon the iron latticework, with the interstices filled with plaster, are frequently used instead of concrete. A very light and superior floor is thus made, and the rigidity of the whole system considerably increased.—The use of plaster for the filling in between the beams has not been adopted in England or America, because of the greater cost and inferior quality of the plaster that can be obtained. The system known as that of Fox and Barrett has been used extensively in England. Light strips of wood with narrow spaces between them are supported on the bottom flanges of the beams, and reach from beam to beam. On these strips is spread a layer of coarse mortar, which is pressed down between them. Concrete, made with cement, is filled in between the beams, and a tile or wooden floor is laid immediately upon it. A rough and a finishing coat of plaster are put directly on the cement to form the ceiling below. Floors have also been made by the use of arched plates of wrought iron or of corrugated sheet iron supported upon the lower flanges of the beams, with a filling of concrete above the arched plates or corrugated iron on which the floor is laid. The system of light segmental brick arches springing from the lower flanges of the beams and levelled up with concrete is that most generally employed in this country and in England. It is more strictly fire-proof than any other, and much more economical than the use of arched plates or corrugated sheet iron, and, except in France, where plaster is cheap, than the French system. The weight of the floors themselves forms a much greater part of the total load to be carried by the beams than in the lighter French system; but on the other hand, the arches and concrete add materially to the strength and rigidity of the beams, not only by preventing lateral deflection, but by adding to some extent the resistance to compression of so much of the arches or concrete as is above the neutral line to that of the upper parts of the beams, whereby they become in fact an integral part of the beams themselves. Long beams should be supported in the middle of their length by wooden scantlings until the cement of the arches or concrete is set, in order to get the full advantage of this additional resistance. The arches should have a rise of not less than one inch to the foot of span, and are generally the width of a brick in thickness, unless the span exceeds 6 or 8 feet, when they should be 8 inches at the soffit and 4½ inches at the crown. If a wooden flooring is to be used, wooden strips parallel with the beams are laid in the concrete filling above the arches, to which the flooring can be nailed. To form the ceiling below the beams, wooden strips may be secured to the lower flanges of the beams, to which ordinary furring, lathing, and plastering can be nailed; or the plaster may be put directly upon the arches, so as to show the system of construction, and thus with suitable mouldings a good architectural effect can be obtained. Any inequality in the thrust of the arches on the beams is counteracted by the tie rods perpendicular to the length of the beams connecting them together. The load to be sustained by the floors of dwellings, offices, and buildings, other than manufactories and buildings for the storage of heavy goods, is ordinarily assumed at 150 lbs. per square foot. The weight of the beams, arches, concrete, &c., forming the floor, will ordinarily be about 75 lbs. per square foot, leaving 75 lbs. per square foot for the variable load. This is as great a load as can be brought upon a floor by a crowd of people. For wrought-iron floor beams the actual or safe working load should not produce a greater strain than 12,000 lbs. per square inch of section at the part of the beam which is subjected to the greatest strain by the action of the load. In the following part of this

article the term "safe load" will mean the load corresponding to that strain. The safe load will be less than one third of the ultimate or breaking strength of the beam, thus allowing a sufficient margin of strength to insure safety. The deflection of floor beams should not exceed $\frac{1}{80}$ of an inch for each foot of span. If the depth of the beam is not less than $\frac{1}{24}$ of the span, the deflection will be within that limit for the safe load. For spans for which a greater depth than 15 inches is not required, solid-rolled beams are ordinarily used, and for greater spans riveted beams.—The following table gives the dimensions, weights per yard, and coefficients to determine the safe loads for rolled wrought-iron beams of the sizes most used in this country:

DIMENSIONS OF BEAM IN INCHES.			Weight per yard in lbs.	Coefficient for strength.	Limitation of coefficient.	Correction for lateral resistance.
Depth.	Thickness of stem.	Breadth across flanges.				
15	0·6	5·75	200	748,000	12 ft.	882
15	0·5	5	150	551,000	11 "	705
12	0·6	5·5	170	511,000	10 "	835
12	0·47	4·8	125	377,000	10 "	645
10	0·47	5	135	360,000	11 "	603
10	0·38	4·5	105	286,000	11 "	555
9	0·57	4·5	125	268,000	8 "	585
9	0·38	4	85	189,000	8 "	435
9	0·3	3·5	70	152,000	8 "	329
8	0·38	4·5	80	168,000	9 "	566
8	0·3	4	65	135,000	8 "	423
7	0·38	3·5	60	102,000	6 "	317
6	0·3	3·5	50	76,800	6 "	324
6	0·25	3	40	62,600	6 "	239
5	0·31	3	40	49,100	5 "	261
5	0·25	2·75	30	38,700	4 "	218
4	0·31	3	37	36,800	4 "	263
4	0·25	2·75	30	30,100	4 "	215

The safe load, uniformly distributed over the span, when the beam is supported at both ends, and lateral deflection is presented by the filling between the beams, will be found, in pounds, by dividing the coefficient given in the table by the span estimated in feet. If the span be less than that given in the column headed "Limitation of coefficient," the load should nevertheless not exceed the safe load for that span, in order that the shearing strain upon the stem shall not exceed the safe limit. The deflection at the middle of the span, for the safe distributed load as given by the above rule, will be found by dividing the square of the span, estimated in feet, by 70 times the depth of the beam, estimated in inches; and for any less load, it will be proportionally less. If the beam is free to deflect laterally, the coefficient given in the table must be modified, to allow for the increased strain brought upon the beam, as follows: multiply the coefficient by the number given in the column headed "Correction for lateral resistance," and divide the product by the sum of that number and the square of the span estimated in feet. The strength of various forms and dimensions of riveted beams may be determined by the ordinary formulas for the strength of materials.

BEAN, the seed of leguminous plants of three genera, *faba*, *phaseolus*, and *dolichos*, of which the *faba vulgaris* furnishes the different varieties of the common bean cultivated for food throughout the world. It originated in the East, is said to be still found wild in Persia, and has been known and cultivated in all ages. The French kidney bean (*haricot*) is the seed of the *phaseolus vulgaris;* and in India and South America species of *dolichos* are raised, such as the sword bean of India (*D. ensiformis*) and the Lima bean (the latter extensively cultivated in the United States), and furnish an important item of food. The common bean is either a running vine, trained on frames, bushes, or poles, or a bushy shrub growing one or two feet high, and requires a rich, well prepared soil, which it does not exhaust, and in which it grows rapidly and luxuriantly. It bears a pod containing several oblong, rounded seeds, which are used when soft and green, or, when dry, ground into meal or softened by soaking in

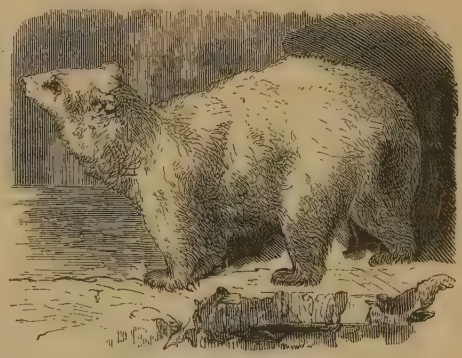
Bean (Faba vulgaris).

water and boiling or baking. Beans are highly nutritious, containing 84 per cent. of nutritious matter, while wheat has but 74 per cent. For horses this food is more nourishing than oats. Baked beans are a healthful, strengthening, and favorite dish throughout the northern states, especially in rural regions; and in France and in the United States several varieties are cooked and eaten with the green pods, while French beans and pods are cut up and salted for winter use in Germany and Holland. The garden and field beans brought to market have a variety of names, among which the Lima, Windsor, dwarf, and kidney are favorites.—In ancient times beans were used as ballots, white for affirmative and black for negative. Ovid gives a description of an important ceremony, in which the master of a family, after washing his hands three times, throws black beans nine times over his head, with the words "I redeem myself and family

by these beans." Pythagoras urged abstinence from beans, and the Egyptian priests considered the sight even of beans to be unclean.—The name bean is also applied to the fruit, berry, or product of such plants as the castor, coffee tree, tamarind, vanilla vine, and some others.

BEAN GOOSE. See Goose.

BEAR (*ursus*). "The family of bears are classed," says Robert Mudie in his "Gleanings from Nature," "among those carnivorous animals which are plantigrade, or walk upon the soles of their feet. They differ from the more typical carnivora in many respects. In the first place, they do not confine themselves to animal food, but eat succulent vegetables, honey, and other substances which are not animal; in the second place, they do not kill the animals which they eat in what may be called a business-like manner, by attacking them in some vital part, but, on the contrary, hug or tear them to death; and in the third place, those of them that inhabit the cold climates, which are their appropriate places of residence, often hibernate during the winter, or some part of it, which is never done by the characteristic carnivora. There are bears in almost all latitudes, from the equator to the pole; but those which inhabit the warmer latitudes are tame and feeble as compared with the natives of the cooler ones, and therefore we must regard them as being, in their proper home and locality, animals of the colder regions of the globe. The whole genus has in fact a polar rather than an equatorial character, and may thus be considered as geographically the reverse of the more formidable of the strictly carnivorous animals—the lion and tiger in the eastern, and the jaguar in the western hemisphere. These are all tropical in their homes, habitually ardent in their temperaments, and, though they can endure hunger for considerable periods, they feed all the year round, and thus have no season of repose. The bears, again, are seasonable animals, retiring during the winter, and coming abroad in the spring. But it is not from the storm that the bears retire; it is from the cold serenity—the almost total cessation of atmospheric as well as of living action—which reigns during the polar winter; the storm is both seedtime and harvest to the bears. During its utmost fury they range the wilds and forests, accompanied by the more powerful owls and hawks, which, like the bears, are equally remarkable for their strength and their impenetrable covering. At those times many of the smaller animals are dashed lifeless to the earth by the storm, or shrouded in the snow, and upon these the bears make an abundant supper—a supper of days, and even of weeks—before they retire to their long rest. So also, when the storm begins to break, they find a plentiful collection of the carcasses of such animals as have perished in the snow, and been concealed from sight and preserved from putrefaction under it."—The polar bear (*U. maritimus*) is the largest, strongest, most powerful, and, with a single exception, the most ferocious of bears. Its distinguishing characteristics are the great length of its body as compared with its height; the length of the neck; the smallness of the external ears; the large size of the soles of the feet; the fineness and length of the hair; the straightness of the line of the forehead and the nose; the narrowness of its head, and the expansion of its muzzle. It is invariably of a dingy white hue. The size varies considerably. Capt. Lyon mentions one 8 ft. 7 in. long, weighing 1,500 lbs. The domestic habits of these powerful animals are not much understood, and whether they hibernate or not is not very well ascertained, although it is believed that the male at least is not dormant so long as the land bears of the north. The admirable work of Dr. Kane seems to place it in doubt whether either sex absolutely hibernates, as we find she bears with their cubs visiting his winter quarters during the midnight darkness. The pairing season is understood to be in July and August; and the attachment of the pair is



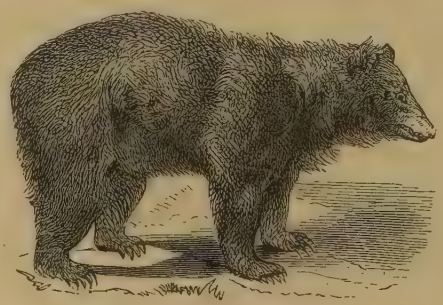
Polar or White Bear (Ursus maritimus).

such, that if one is killed the other remains fondling the dead body, and will suffer itself to be killed rather than leave it. The same wonderful affection of the female for her cubs has been noticed, from which neither wounds nor death will divide her; and all the arctic navigators, from Dr. Scoresby to Dr. Kane, have recorded their sympathy with and regret for the poor savage mothers, vainly endeavoring to persuade their dead cubs to arise and accompany them, or to eat the food which they will not themselves touch, although starving. The habits of the polar bear are purely maritime; and although their system of dentition is the same with that of the other bears, their food, from necessity, is wholly animal. The polar bear is comparatively rare in menageries, as it suffers so much from the heat, even of our winters, and from the want of water, that it is not easily preserved in confinement.—The next bear in all respects to the polar species, and superior to him in ferocity and tenacity of life, is the grisly bear (*U. horribilis*) of America. This powerful animal, which is to the American fauna what the Bengal tiger is to that of

Hindostan and the lion to that of central Africa, is of comparatively late discovery, having been first distinguished by Lewis and Clarke in their western explorations. Its geographical range

Grisly Bear (Ursus horribilis).

is from the great plains west of the Missouri, at the foot of the Rocky mountains, through Upper California to the Pacific ocean. Its characteristics are strongly marked and clear. "The line of its forehead and muzzle is straighter than in any other species; and its claws, especially those of the fore feet, are much more produced and far more crooked, though its general habit is not that of a climber. The snout is black and movable, the central furrow being distinct; the lips are partially extensile; the eyes very small, having no third eyelid, and the irides being of reddish brown. The ears are short and rounded, and the line of the forehead thence to the eyes is a little convex, but it continues straight to the point of the snout. The hair on the face is very short, but on the body generally it is long and very thickly set. The hair in the adult is a mixture of brown, white, and black. The tail is short, and in the living animal completely hidden by the hair. On the fore paws the claws are rather slender, but long, as well as crooked and sharp at the tips, though the sharpness is rather that of a chisel, by being narrowed at the edges, than a point. This structure gives the tips of them great additional strength, and accounts for the severe gashing wounds which are inflicted by their stroke. The soles of the hind feet are in great part naked, and the claws on them are considerably smaller than those on the fore paws, though much more crooked; and their trenchant points form very terrible lacerating instruments when the animal closes with its enemy in hugging. They are sufficient to tear the abdomen even of a large animal to shreds, while the fore paws are at the same time compressing the thorax to suffocation." The grisly bear is the most savage of his race. If it be not certain that he will voluntarily attack a human being, it is certain that if attacked he will pursue the assailant to the last, nor quit the conflict while life remains. He is also the most tenacious of life of all animals. One shot by Gov. Clarke's party, after receiving ten balls in his body, four of which passed through his lungs and two through his heart, survived above 20 minutes, and swam half a mile, before succumbing to his wounds. The cave bear (*U. spelæus*), larger than the grisly bear, lived in the caverns of Europe in the post-tertiary epoch.—The European brown bear (*U. arctos*) and the American black bear (*U. Americanus*) are closely allied, and are very similar in habits, although the former is fiercer and more sanguinary, especially as he



Black Bear (Ursus Americanus).

grows old, when he will, though rarely, attack men, particularly if he have once tasted human blood. They are both excellent climbers, passionately fond of honey, great devourers of roots, green wheat, and in America green maize, and especial enemies to hogs and young calves. The brown bear is distinguished by the prominence of his brow above the eyes, which is abruptly convex, with a depression below them; the black bear, by the regular convexity of its whole facial outline, from the ears to the muzzle. The latter never attacks man except in

Cinnamon Bear (Ursus occidentalis).

self-defence, and then only when hard pressed and cornered. The flesh of the black bear is very good, resembling pork with a peculiar wild or perfumed flavor.—The cinnamon bear (*U. occidentalis*) is generally regarded as a mere variety of the black bear, whose place it takes to the west of the Rocky mountains. It receives its name from the yellowish red color of the fur. It is not uncommon in California, and often descends from the upper sierras into the valley villages in winter in search of food; though very fond of berries and nuts, it occasionally takes a calf, pig, or sheep; it is savage if attacked or wounded.—The Asiatic or sloth bear (*U. labiatus*, so called from its long lips) is a

Asiatic or Sloth Bear (Ursus labiatus).

timid, inoffensive creature ordinarily, though it will fight fiercely when wounded, or in defence of its young. It inhabits the high and mountainous regions of India, burrows in the earth, feeds on ants, rice, and honey, and lives in pairs, together with its young, which when alarmed mounts the back of the parent for safety. It is called sloth bear from the edentate character of the jaws, from the early loss

Syrian Bear (Ursus Isabellinus).

of the incisor teeth, and the filling up of the sockets.—The Syrian bear (*U. Isabellinus*) is interesting chiefly because it is the one often alluded to in the Jewish Scriptures. When young it is grayish brown, becoming nearly white when old; the hair is long, somewhat curled, forming a mane upon the shoulders, and near the skin surrounded by a soft fur. It is gentle in disposition, a vegetable feeder, and is found now in the mountains of Palestine.—Three or four other species of bears, principally Asiatic, have recently been distinguished, but all of very inferior interest to those above specified, and one at least of extremely doubtful authenticity as a distinct species. This is the Siberian bear (*U. collaris*), so nearly identical with the common black bear as to be distinguished from it only by a white or grizzly collar encircling its shoulders and breast, and is probably a mere casual variety. It is said to be peculiar to Siberia. The spectacled bear (*U. ornatus*) is a native of the Chilian Andes. Its fur is smooth, shining, and black, with the exception of a pair of semicircular marks over the eyes, whence its name, and the fur on its muzzle and its breast, which is of a dirty white color; little or nothing is

The Spectacled Bear (Ursus ornatus).

known of its habits. The Thibetan bear or Isabel bear (*U. Tibetanus*) is characterized by the shortness of its neck and the straightness of its facial outline. Its color is black, with a white under lip, and a white mark in the shape of a letter Y, the stem lying on the middle of the breast, with arms diverging upward on the shoulders. It is a small-sized, harmless, and purely vegetable-eating animal. The Malayan sun bear (*helarctos Malayanus*) is small, jet black, with a lunar white mark on its breast, and a yellowish muzzle. It has a long, slender, protrusive tongue, unlike that of other bears. It is perfectly inoffensive, feeding on honey and the young shoots of the cocoanut trees, of which it makes extreme havoc. When domesticated it becomes exceedingly tame, is sagacious, intelligent, and affectionate, and will not touch animal food. The Bornean bear (*H. euryspilus*) differs from the above by having a large orange-colored patch on the chest. It does not

exceed four feet in length, and has the long, slender, protrusive tongue of the species last described, fitting it especially to feed on honey, which, with fruits and vegetables, is its sole

Malayan Sun Bear (Helarctos Malayanus).

food.—There has always existed a doubt as to the existence of any species of bear in Africa. Pliny mentions that in the consulship of M. Piso and M. Messala, 61 B. C., L. Domitius Ahenobarbus exhibited 100 Numidian bears, and as many Ethiopian hunters, in the circus; but at the same time he asserts that there are no bears in Africa. Herodotus, Virgil, Juvenal, and Martial all speak of Libyan bears as well known animals. Ehrenberg and Forskal both speak of a black plantigrade animal called by the natives *kawai* or *karrae*, with a long muzzle, which they both saw and hunted, but in vain. It is, however, a good rule in natural history to adopt no animal on hearsay, or until a specimen is produced. On this view it must be held that there is no African bear until one shall be produced and described; although there is no reason why there should not be.—Bear-baiting with mastiffs was formerly a favorite and even royal amusement in England; and the readers of "Kenilworth" will remember the characteristic scene in which Essex is represented as pleading before Elizabeth the cause of the bear warden against the stage players, Raleigh defending the latter, and quoting the passage of Shakespeare personifying the queen as "a fair vestal throned in the west," on which she suffers the bear ward's petition to drop unheeded into the Thames. In the north of Europe the brown bear is hunted in the winter with snow shoes, and shot without the aid of dogs. In the west and southwest of the United States, the bear is systematically chased with packs of hounds bred for the purpose—a cross generally of the large slow foxhound with the mastiff; and the sport is highly exciting, and by no means devoid of danger, when Bruin turns to bay, and it becomes necessary to go in with the knife, to close quarters, in order to save the lives of the hounds.

BEAR, Great and Lesser (*ursa major* and *minor*), two constellations of the northern hemisphere. The former in the latitude of 45° N. never passes below the horizon. The most remarkable stars in it are a group of seven (marked by astronomers with the first seven letters of the Greek alphabet), which have been called the "wagon," "Charles's wain," and the "dipper." Four of them are arranged in an irregular quadrangle, constituting the body of the "dipper," while the other three are nearly in a straight line, and form the handle. Two of the stars in the body of the dipper range nearly with the north star, and are therefore called the "pointers." Mizar, in the handle, is a double star. Benetnash is a brilliant star of the first magnitude, according to some maps; in others it is set down at 1½. —The Lesser Bear has in it a cluster somewhat resembling the dipper in Ursa Major, but has no stars larger than the third magnitude. Neither of these constellations has any resemblance to the figure of a bear, and Max Müller is of opinion that the Greeks, by whom they were first called after that animal, applied to them the term ἄρκτος (bear) by a corruption of their original Sanskrit name *arkshas*, "the bright stars."

BEARD, the hair which grows on the chin and lower parts of the human face. That portion which is found on the upper lip is generally distinguished as the mustache, while that upon the sides of the face is known by the name of whisker. Although the beard is ordinarily only seen on the male adult, it appears occasionally in certain exceptional cases on the faces of women and children. Full beards were cultivated among eastern nations in early times, and have always been regarded by them as a badge of dignity. The fact that the ancient Egyptian pictures frequently represent the human male figure, especially when of a king or dignitary, without the beard, would seem to indicate that it was a mark of rank in Egypt to be devoid of that appendage. In ancient India, Persia, and Assyria, however, the beard was allowed to grow long, and was always esteemed a symbol of dignity and wisdom. The Turks let the beard grow in full luxuriance, while the Persians cut and trim that upon the chin and the sides of the face, according to fashion or caprice. In Turkey it is considered an infamy to have the beard cut off, and the slaves of the seraglio are shaved as a mark of their servile condition. Previous to the reign of Alexander the Great the Greeks wore beards, but during the wars of that monarch they commenced shaving, the practice having been suggested, it is said, by Alexander for the purpose of depriving the enemy of an opportunity of catching the soldiers by the beard. The fashion thus begun continued until the reign of Justinian, when long beards again became customary. The year 300 B. C. is given as the time about which the Romans commenced the practice of shaving, and Scipio Africanus was,

according to Pliny, the first of the Romans who daily submitted to the razor. The antique busts and coins prove that the Roman emperors shaved until the time of Hadrian, who is said to have let his beard grow to conceal an ugly scar. The philosophers, however, from the earliest periods seem to have affected the full-grown beard, it being esteemed by them, as among the Greeks, a symbol of wisdom. All the ancient inhabitants of Europe wore beards at the earliest period of which any record exists. The fashion, however, seems to have varied with them subsequently at different times. The Lombards or Longobards derived their name from the practice of going unshaved. We learn from Tacitus that the ancient Germans cultivated the beard from its first growth until they had killed an enemy in battle, and from Julius Cæsar that the Britons merely allowed the mustache to grow. Until the introduction of Christianity the Anglo-Saxons all wore beards without distinction, but then the clergy were compelled by law to shave. The English princes were in the habit of wearing mustaches till the conquest of William I., and they felt it to be a very great indignity when the conqueror compelled them to cut them off, in accordance with the Norman fashion. The practice and precepts of the Christian fathers, who, like the Jewish rabbis, denounced shaving as a violation of the law of God, made the wearing of the beard during the early mediæval centuries a distinguishing fashion of the continental kings, nobles, and dignitaries. Royal personages were in the habit of weaving gold with the beard, or ornamenting it with tags of that metal. Of long beards, one of the most wonderful was that of a German artist of the name of John Mayo, who was called John the Bearded; it reached the ground when he stood up, and he was consequently obliged to tuck it into his girdle. Till the separation of the Greek from the Latin church, which began in the 8th century, the popes, emperors, nobles, and, except in England, the priests had scrupulously abstained from the use of the razor. Leo III., to distinguish himself from the patriarch of Constantinople, removed his beard. Thirty years later Gregory IV., pursuing the same system, enjoined penalties upon every bearded priest. In the 12th century the prescription which required all the clergy to shave their faces was extended to the laity, and even to monarchs. Godefroi, bishop of Amiens, refused the offerings of any one who wore a beard. A preacher directed his eloquence against King Henry I. of England because he wore a beard, and the monarch yielded. Frederick Barbarossa offered a similar example of resignation. The confessor of Louis VII. of France refused him absolution till he submitted to lose his beard. This was not long kept up. In the 13th century Pope Honorius III., in order to conceal a disfigured lip, allowed his beard to grow, and inaugurated anew the fashion, which became prevalent in Europe in the age of Francis I. The right of the clergy to wear their beards was then again disputed. Francis imposed a heavy tax upon every bearded bishop, and in 1561 the college of the Sorbonne decided, after mature deliberation, that a beard was contrary to sacerdotal modesty. In the reign of Henry IV. there were various styles, distinguished as the pointed beard, the square beard, the round beard, the aureole beard, the fan-shaped beard, the swallow-tailed beard, and the artichoke-leaf beard. In England, during the reign of Queen Elizabeth, the beard was worn generally by those of higher rank, and was trimmed in a style more or less distinctive of each class. The fashion of wearing the beard declined under the Stuarts, and at the restoration there was no hair worn upon the face but the mustache, which, however, was luxuriantly cultivated by the courtiers and gallants of those days. The decline of the beard in France dates from Louis XIII., and in Spain from the accession of Philip V. The Russians retained their beards until Peter the Great returned from his western tour, when one of his first edicts toward the compulsory civilization of his people had reference to the beard. He taxed this appendage, and afterward ordered all those he found bearded to have the hair plucked out with pincers or shaven with a blunt razor. Thus the practice of shaving became almost universal in Europe until a comparatively recent period. France was the first to return to the old fashion of wearing the beard, and England was the last.—The practice of wearing the beard is advocated by many physicians for hygienic reasons, as protecting the throat from cold and damp.

BEARD. I. James H., an American painter, born in Buffalo, N. Y., in 1815. In early infancy he was removed to Painesville in northern Ohio, where at the age of 14 he began to paint portraits, after having received only four lessons from a travelling artist. He subsequently practised portraiture in many parts of Ohio, and finally settled in Cincinnati, where he gained the friendship of Henry Clay, Gens. Harrison and Taylor, and other public men, of most of whom he painted portraits. For many years he was esteemed the leading artist in his peculiar walk. In 1846 he produced his first original picture, "The North Carolina Emigrants," which was exhibited and sold in New York, and at once established his reputation as a genre painter. Among his other pictures are "The Long Bill" and "The Land Speculator;" and his latest work, "Out all Night," has been engraved in London. Of late years he has devoted himself principally to composition and the painting of domesticated animals. His works are characterized by natural force and simplicity, with correct drawing, and a keen sense of humor. **II. William H.,** an American painter, brother of the preceding, born in Painesville, Ohio, about 1824. At 21 years of age he took up portrait

painting, and about 1850 opened a studio at Buffalo, N. Y., where he soon after began to devote himself exclusively to genre and animal painting. After acquiring a considerable local reputation he visited Europe in 1858–'60, and in the latter year settled in New York. He is noted for the production of a series of works conceived in a vein of grotesque humor, in which bears, apes, and other animals enact scenes from the drama of human life. Prominent among these are his "Bears on a Bender," "Court of Justice," "Dance of Silenus," "Bear Dance," and "Watchers." In some of his pictures the comic element predominates; others are almost entirely satirical.

BEAR LAKE, Great, a body of water in North America, between lat. 65° and 67° N. and lon. 117° and 123° W., 200 ft. above the sea, irregular in shape, with an area estimated at about 14,000 sq. m. Its extreme length is about 150 m., and greatest breadth 120 m. Its chief supply is from the Dease river; its outlet is Bear Lake river. The lake water, which is very clear, and appears of a light blue color, has been sounded to the depth of 270 ft. without bottom, and abounds in fish, particularly the herring-salmon. The second land expedition under Franklin, in 1825, wintered at the S. W. extremity of the lake, and built Fort Franklin, afterward one of the Hudson Bay company's stations. Simpson, Richardson, and others, journeying from Canada to the Arctic ocean, have passed this point. The lake, which is 4° S. and 23° W. of the magnetic pole, as determined by Ross in 1831, is the basin of a watershed 400 m. in diameter.

BEAR LAKE RIVER, the outlet at the S. W. extremity of Bear lake, runs S. W. 70 m. and joins Mackenzie river in lat. 64° 59′ N., about 500 m. from the mouth of that river in the Arctic ocean. The breadth of Bear Lake river is not less than 450 ft. except at a point 35 m. from the lake, where "the Rapid" descends 3 m. through high rock walls. The depth of the stream is from one to three fathoms, and the current is 6 m. an hour. It receives in its course several small branches.

BEAR MOUNTAIN, in the N. E. corner of Dauphin co., Penn., 750 ft. high, is near a valley of the same name, having rich deposits of anthracite coal, and belongs to the first or southern coal district of Pennsylvania.

BÉARN, formerly a province of S. W. France, bordering on Spain, now forming the eastern and larger part of the department of Basses-Pyrénées. It is mountainous and well watered, and excellently adapted for raising cattle and horses. The name is derived from its primitive inhabitants, the Beneharni. The bulk of the present population is of Basque descent, still speaking the Basque tongue, and understanding very little French; the people are energetic, industrious, and freedom-loving. Béarn was a part of ancient Aquitania, and fell into the hands of the Visigoths, and afterward of the Franks. Its first feudal possessor, Centullus, is mentioned in the 9th century, and his descendants ruled it to the close of the 13th century, when it came into possession of the counts of Foix by marriage, and by the female line of this house into the hands of the kings of Navarre, by the last of whom, Henry IV., it was united with France, though the act of annexation was not finally accomplished till 1620.

BEAR RIVER. I. A stream in Utah territory, 400 m. long, which rises in a spur of the Rocky mountains about 75 m. E. of Salt Lake City, flows first N. W. into Idaho territory, where it makes a sharp bend and returns by a S. S. W. course into Utah, and falls into Great Salt lake. At the bend of the river in Idaho, about 45 m. from Lewis river, are the Beer and Steamboat springs, highly impregnated with magnesia and other mineral substances. The valley, which is 6,000 ft. above the sea, through most of its extent is narrow, but portions of it are described by Fremont as extremely picturesque. **II.** A river in California, which rises on the W. slope of the Sierra Nevada, runs W. and S., forming the boundary for some distance between Yuba and Placer counties, and unites with Feather river, 31 m. below Marysville.

BEAS, or **Beypasha** (anc. the upper *Hyphasis*), a river of the Punjaub, in western India. It rises in the Himalaya mountains, 13,200 ft. above the level of the sea, and flows into the Sutlej at Endreesa, lat. 31° 10′ and lon. 75° 4′. Its length is about 250 m. In the winter it is fordable in most places, but in summer has been known to be 740 yards wide and have a swift current at a distance of 20 m. from its confluence with the Sutlej.

BEASLEY, Frederick, an American divine, born near Edenton, N. C., in 1777, died at Elizabethtown, N. J., Nov. 2, 1845. In 1801 he was ordained deacon in the Episcopal church, and was successively rector in Albany, N. Y., and in Baltimore, Md. He was from 1813 to 1828 professor of moral philosophy in the university of Pennsylvania, and published in defence of the philosophy of Locke a "Search of Truth in the Science of the Human Mind" (1822). After retiring from the university he took charge of a church in Trenton, N. J., where he wrote an answer to the doctrinal views of Dr. Channing. From 1836 he lived in retirement at Elizabethtown.

BEATIFICATION, in the Roman Catholic church, an act of the pope whereby a deceased person is declared blessed previous to being canonized as a saint. The person must have had a reputation for sanctity and supernatural gifts, and before the decree is pronounced a long and minute investigation is made into his or her merits, and this cannot be completed till 50 years after death. In early times the decree of beatification was pronounced by bishops, but in 1170 that right was reserved to the holy see by Alexander III., and has been held by it ever since.

BEATON, Beton, Beatoun, or **Bethune, David,** a Scottish statesman and ecclesiastic, born in

1494, assassinated at St. Andrews, May 28, 1546. He was educated at St. Andrews and at Paris, and received from his uncle, James Beaton, archbishop of St. Andrews, the rectory of Campsie and the abbacy of Arbroath. He was ambassador to France 1519–'25, became a favorite of James V., and was appointed lord privy seal in 1528. In 1533 he was sent to France to conclude a treaty of marriage between James and Magdalene, daughter of Francis I., and again after her death in 1537 to bring over Mary of Guise. Francis I. made him bishop of Mirepoix, and the following year procured for him from Pope Paul III. the rank of cardinal. In 1539 he succeeded his uncle in the primacy of Scotland as archbishop of St. Andrews. He at once began a vigorous persecution of the reformers in Scotland, compelled many suspected persons to recant, and two men, Norman Gourlay and David Straiton, were burned near Edinburgh. Soon afterward Beaton was appointed by the pope legate *à latere*. After the sudden death of King James (Dec. 13, 1542), leaving as his successor the infant Mary, five days old, Cardinal Beaton conceived the idea of seizing the government, and with the aid of a priest, Henry Balfour, is said to have forged a will for the king, nominating himself regent with three of the nobility as his assistants. This will was proclaimed at the cross of Edinburgh a few days after the death of the king, and the cardinal took possession of the regency. But the earl of Arran, who had prospective claims to the succession, called an assembly of noblemen, who set aside Beaton and put Arran in his place. The cardinal, however, had the support of the queen dowager and of powerful friends; and after a brief imprisonment he was released and made lord high chancellor (December, 1543), and soon succeeded in making the weak Arran his tool. The English invasion which soon followed was successfully opposed, and during the succeeding peace the regent, by the advice of Beaton, endeavored to strengthen the Scottish connection with France. Fully established in the civil as well as ecclesiastical administration of affairs, the cardinal renewed his persecution of reformers, hanging, drowning, and burning several of them. In 1546 he burnt George Wishart, the most eminent preacher among the reformers, and sent to the stake several of his followers. His enemies, seeing no other hope of relief from these persecutions, resolved upon his death. Early in the morning of May 28, 1546, several conspirators entered the cardinal's bedchamber in the castle of St. Andrews. The assassins were Norman Leslie, Peter Carmichael, and James Melville, who charged him with his wicked life, and especially his murder of George Wishart, and struck him down with daggers and a stag sword. As he fell, he cried out, "Fie, fie! I am a priest; all's gone." Cardinal Beaton lived luxuriously, and was scandalously licentious. He is said to have written an account of his embassies, and other works. He was eminently successful in diplomacy.

BEATRICE PORTINARI, the object of the poetical devotion of Dante, born about 1266, died in 1290. She was the daughter of Falco Portinari, a noble Florentine, and is represented as possessing remarkable graces of person and of mind. The poet first met her at a social party when she was but nine years of age, and was at once so affected that he became almost speechless. The story of his love is recounted in the *Vita Nuova*, which was mostly written after her death. Dante saw little of Beatrice during her lifetime, but she grew in his mind and imagination to be the embodiment of divine truth, and in this character she appears in the *Divina Commedia*. She was married before 1287 to Simone dei Bardi, a citizen of Florence.

BEATTIE, James, a Scottish poet, born in Kincardineshire, Oct. 25, 1735, died in Aberdeen, Aug. 18, 1803. He obtained a scholarship at Marischal college, Aberdeen, and in 1758 became one of the masters in the Aberdeen grammar school, and married the daughter of the head master. In 1760 he was appointed professor of moral philosophy in Marischal college. In 1765 he published a poem, "The Judgment of Paris," which gained no celebrity. The work which won him the greatest fame was an "Essay on the Nature and Immutability of Truth," designed as a reply to Hume, which was translated into several languages, and procured for its author the degree of LL. D. from the university of Oxford, and a private conference with George III., who granted him a pension of £200. While in London he became intimate with Dr. Johnson, Dr. Porteus, and other distinguished literary characters. His famous poem "The Minstrel" appeared in parts from 1771 to 1774. In 1783 he published "Dissertations, Moral and Critical," and in 1786 "The Evidences of the Christian Religion," written at the request of the bishop of London. In 1790 he published the first volume, and in 1793 the second, of his "Elements of Moral Science;" subjoined to the latter was a dissertation against the slave trade. His last publication was an account of the life, writings, and character of his eldest son, James Hay Beattie.

BEAUCAIRE, a commercial town of France, department of Gard, on the right bank of the Rhône, 12 m. E. of Nîmes; pop. in 1866, 9,395. It is opposite Tarascon, with which it is connected by a suspension bridge, and is near the junction of railways to Avignon, Marseilles, Cette, and Alais, by Nîmes. It has considerable trade in grain, flour, and wine, and an annual fair in July, established in 1217 by Raymond VI., count of Toulouse, which was formerly the largest in Europe. The canal de Beaucaire, opened in 1773, connects the town with Aigues-Mortes.

BEAUCE, a S. E. county of the province of Quebec, Canada, bordering on Maine; area, 1,150 sq. m.; pop. in 1871, 27,253. Its greatest length is about 45 m., and its greatest width

about 30 m. It is traversed by the river Chaudière, and watered by several of its branches. Chief town, St. Joseph.

BEAUCHESNE, Alcide Hyacinthe du Bois de, a French author, born at Lorient, March 31, 1804. He belongs to an ancient Breton family, became in 1825 prominently connected with the department of fine arts, and in 1827 with the court of Charles X. Since 1853 he has been connected with the archives, which enabled him to collect materials for his principal work, *Louis XVII., sa vie, son agonie et sa mort* (2 vols., 1852; 4th ed., 1866), and which with the sequel, *Vie de Mme. Élisabeth* and *Le livre des jeunes mères*, poems (1858; 2d ed., 1860), received a prize from the academy. He is also the author of *Souvenirs poétiques* (1830; 3d ed., 1834), &c.

BEAUCLERK, Topham, one of Dr. Johnson's favorite friends, born in 1739, died March 11, 1780. He was the only son of Lord Sidney Beauclerk, third son of the first duke of St. Albans, the son of Charles II. by Eleanor Gwynn. He studied at Oxford, and his conversational talents so much charmed Johnson that when the "Literary Club" was founded he was one of the nine original members. When he went to Italy in 1762, Johnson wrote to his friend Baretti warmly commending Beauclerk to his kindness. In 1765 he accompanied Johnson on a visit to Cambridge. He seduced Lady Diana Spencer, wife of Viscount Bolingbroke and daughter of the duke of Marlborough, in 1768, and married her immediately after she was divorced.

BEAUFORT. I. An E. county of North Carolina, bordering on Pamlico sound and intersected by Pamlico river, which is navigable by vessels drawing 8 ft. of water; area, about 1,000 sq. m.; pop. in 1870, 13,011, of whom 4,632 were colored. The surface is level and the soil sandy or marshy. Tar and turpentine are produced in large quantities. The chief productions in 1870 were 179,994 bushels of Indian corn, 102,626 of sweet potatoes, 1,987 bales of cotton, and 59,206 lbs. of rice. There were 706 horses, 2,469 milch cows, 4,338 other cattle, 2,883 sheep, and 16,730 swine. Capital, Washington. **II.** A county forming the southern extremity of South Carolina, bounded N. E. by the Combahee river, S. E. by the Atlantic ocean, and separated on the S. W. from Georgia by the Savannah river; area, 1,540 sq. m.; pop. in 1870, 34,359, of whom 29,050 were colored. It is watered by the Broad, Coosawhatchie, and New rivers, which are all navigable by small vessels. On the coast are several islands, the principal of which are Port Royal, St. Helena, and Hilton Head, producing sea island cotton. The Charleston and Savannah railroad traverses the county. The surface is low, the soil sandy and alluvial. The chief productions in 1870 were 285,532 bushels of Indian corn, 118,036 of sweet potatoes, 7,486 bales of cotton, and 9,069,130 lbs. of rice. There were 1,721 horses, 1,304 mules and asses, 4,219 milch cows, 4,903 other cattle, 1,921 sheep, and 16,583 swine. Capital, Beaufort.

BEAUFORT. I. A town and port of entry, capital of Carteret county, North Carolina, at the mouth of Newport river, a few miles from the sea, 11 m. N. W. of Cape Lookout, and 130 m. S. E. of Raleigh; pop. in 1870, 2,430, of whom 1,242 were colored. It is accessible by steamboat from Albemarle sound, and has a commodious and well sheltered harbor, considered the best in the state. On Bogue point, at its entrance, is Fort Macon. There is an extensive trade, chiefly in turpentine and rosin. **II.** A town and port of entry, capital of Beaufort county, South Carolina, on Port Royal island, and on an arm of Broad river communicating with Port Royal entrance on the one hand and St. Helena sound on the other, about 16 m. from the sea, and 48 m. W. S. W. of Charleston; pop. in 1870, 1,739, of whom 1,273 were colored. It has a spacious harbor, with 24 feet of water on the bar, and is a favorite summer resort. It has some foreign trade, and a weekly newspaper. Beaufort was occupied by the United States forces Dec. 6, 1861, having been abandoned by the confederates after the naval fight at Hilton Head.

BEAUFORT. I. A town of Anjou, France, in the department of Maine-et-Loire, 16 m. E. of Angers; pop. in 1866, 2,629. Among the various manufactures, those of sail cloth are the most famous. Beaufort became a county in the 13th century, and came into possession of King René in the 15th. The ancient castle of Beaufort passed into the hands of the English house of Lancaster at the close of the 13th century, and gave the title to the natural and afterward legitimatized children of John of Gaunt, to whom the lineage of the present English dukes of Beaufort is traced. **II.** The French dukes of Beaufort originated from Gabrielle d'Estrées, mistress of Henry IV., who became duchess of Beaufort from an estate of that name in Champagne, which belonged to her family. **III.** The Belgian dukes and counts of Beaufort or Beauffort trace their title to the beginning of the 11th century, and to a castle of that name in Namur.

BEAUFORT, Sir **Francis,** an English hydrographer, born at Collon, county Lowth, Ireland, in 1774, died in Brighton, Dec. 17, 1857. He was the son of a clergyman of French extraction; entered the navy in 1787; served as midshipman under Admiral Cornwallis; was under Howe in the naval battle off Brest, June 1, 1794; became lieutenant in 1796, and commodore in 1800, in reward for his services at the battle off Malaga, where he was wounded. He acquired scientific reputation by his hydrographic labors on the coast of Asia Minor in 1811–'12, and published "Karamania, or a Brief Description of the South Coast of Asia Minor and of the Remains of Antiquity" (London, 1817), which has proved very useful to later explorers. Wounded in a conflict with Turkish pirates in 1812, while on his way to Syria, he was

obliged to return to England, where subsequently he drew up many maps, and was hydrographer of the admiralty from 1832 to 1855. Geographical and maritime explorations were greatly promoted by his labors, and he was a prominent fellow of the royal society, and member of the astronomical and geographical societies, and a commissioner of the pilot service. He became honorary rear admiral in 1846, and was knighted in 1848.

BEAUFORT, François de Vendôme, duke of, son of César de Vendôme and grandson of Henry IV. of France, born in Paris in January, 1616, died June 25, 1669. He served with some distinction during the 30 years' war, and meddled in the conspiracy of Cinq-Mars against Cardinal Richelieu. In consequence of this last affair he was obliged to seek a refuge in England. On the accession of Louis XIV., the queen regent, Anne of Austria, showed him great favor, which he repaid with insolence. Implicated in a plot against the life of Mazarin, he was imprisoned in the château of Vincennes. Escaping in 1648, he joined the Frondeurs, became extremely popular with the Parisian populace, and was called the king of the markets. He killed his brother-in-law, the duke of Nemours, in a duel, and at the same time one of his seconds, Héricourt, was killed by the marquis de Villars, a second of Nemours. Becoming tired of civil war, he made his peace with the court; and, Louis XIV. having taken into his hands the reins of government, Beaufort was appointed to the command of the navy. In 1664 and 1665 he successfully led attacks against the corsairs of Africa; in 1666 he was at the head of the fleet which was to join the Dutch in the war against England; and in 1669 he went to the assistance of the Venetians, then besieged by the Turks in the island of Candia, where he was killed in a sally.

BEAUFORT, Henry of, an English prelate and statesman, born about 1370, died at Winchester, April 11, 1447. He was a legitimatized son of John of Gaunt by his mistress, afterward his third wife, Lady Catharine Swynford, who had been governess in his family, and he was a half brother of Henry IV. He studied in Oxford and Aix-la-Chapelle, became bishop of Lincoln in 1397, chancellor of the university of Oxford in 1399, bishop of Winchester as successor of William of Wyckham in 1404, and lord chancellor in the parliaments of 1404–'5 and on other occasions. Subsequently he was appointed cardinal of St. Eusebius by Pope Martin V., whose election he had promoted, and who made him legate *à latere* in England for raising a crusade against the Hussites. The pope's good will, however, was lost by his alleged appropriation of the funds for the crusade toward the expenses of the war with France. He was president of the court which sentenced Joan of Arc to death. The wealth amassed in the see of Winchester enabled him to advance nearly £30,000 to his nephew Henry V., and over £10,000 to the infant Henry VI., who was brought up under his care. After the death of Henry V. in 1422, and during the minority of Henry VI., when the duke of Gloucester became regent in the absence of the duke of Bedford, and Beaufort was a member of the council of regency, a struggle for supremacy between Gloucester and Beaufort disturbed the public tranquillity, embarrassed England in her conflict with France for over 20 years, and well nigh culminated in civil war, Bedford and others vainly attempting to reconcile the two rivals. A court of arbitration effected an apparent reconciliation, but Beaufort took umbrage at the terms of their decision, resigned the chancellorship, and went with Bedford to France. He escorted Henry VI. on his coronation in Paris in 1429, and induced parliament to put an end to Gloucester's regency, after which he became so omnipotent that Gloucester put himself at the head of a formidable opposition, renewing former and bringing forward new charges affecting his integrity, questioning the legal compatibility of his cardinal's hat with his episcopal functions, and making his position so untenable that Beaufort could only sustain himself by bills of indemnity from parliament (1432 and 1437) exempting him from punishment for his alleged crimes. Eventually he wreaked his revenge on Gloucester by having him indicted for treason at St. Edmundsbury, and arrested. The duke was found dead on the day appointed for his vindication, and though no signs of violence were detected upon his body, it was not believed that he came to a natural end, and Beaufort, who died about five weeks afterward, was generally supposed to have hastened his death. Shakespeare, in the "Second Part of King Henry VI.," represents the cardinal as having died in an agony of remorse and despair. He bequeathed his property to charitable purposes, endowed the still existing hospital of St. Cross at Winchester, and was buried in the chantry of Winchester cathedral which bears his name.

BEAUFORT, Henry Charles Fitzroy Somerset, 8th duke of, an English soldier and politician, born in Paris, Feb. 1, 1824. He studied at Eton, and became successively aide-de-camp to Wellington, Hardinge, and the duke of Cambridge, retiring from active service in 1861 as lieutenant colonel. He was a tory member of parliament for Gloucestershire from 1846 to 1853, when on the death of his father, who had exercised great political influence by his immense wealth, he succeeded to the peerage.

BEAUFORT, Margaret, countess of Richmond and of Derby, born at Bletsoe, Bedfordshire, in 1441, died in 1509. She was a daughter of the duke of Somerset, grandson of Edward III., and was married to the earl of Richmond, half brother to Henry VI., by whom at the age of 18 years she had one son, afterward king of England under the title of Henry VII. After the death of the earl of Richmond she married

successively Sir Henry Stafford, a connection of the ducal house of Buckingham, and Thomas Lord Stanley, afterward earl of Derby, but had issue by neither of these marriages. She was celebrated for her devotion and charity. By her bounty two colleges, Christ's and St. John's, were endowed at Cambridge, and a professorship of divinity established in each; but the endowments were subsequently recovered by Henry VIII. as her heir at law. She translated the "Mirroure of Golde to the Sinfull Soul," from a French translation of the *Speculum Aureum Peccatorum*, and the 4th book of the "Imitation of Christ."

BEAUGENCY, an old town of France, department of Loire, on the right bank of the Loire, 15 m. S. W. of Orleans; pop. in 1866, 5,039. In 1152 a council was held here which divorced King Louis VII. from Eleanor of Aquitaine, who soon became the wife of Henry Plantagenet, then heir apparent of the crown of England. Beaugency was formerly surrounded by walls, flanked with towers and bastions, and protected by a powerful castle, the ruins of which still remain. The kings of France had a palace here in the 14th century. On Dec. 8, 1870, the German troops under the grand duke of Mecklenburg, after a successful fight at Meung on the 7th, defeated here the French army of the Loire under Gen. Chanzy, who, on the evacuation of Orleans, thus vainly endeavored to cover Tours.

BEAUHARNAIS, Alexandre, vicomte de, a French general, born in the island of Martinique in 1760, guillotined in Paris, July 23, 1794. He was major in a regiment of infantry when he married Joséphine Tascher de la Pagerie, who became after his death the wife of Bonaparte. He distinguished himself in the American war, under the command of Count Rochambeau. In 1789 he was elected deputy to the states general by the nobles of Blois, and was among the first of his order who joined the *tiers-état*. He was twice president of the national assembly, and occupied the chair when the flight of Louis XVI. was made known. A little later he joined, as a general of division, the army of Custine on the Rhine, and was accused of causing the surrender of Mentz by his inaction, for which he was condemned to death by the revolutionary tribunal.

BEAUHARNAIS, Eugène de, duke of Leuchtenberg and prince of Eichstädt, son of the preceding and stepson of the emperor Napoleon, born in Paris, Sept. 3, 1781, died in Munich, Feb. 21, 1824. He served in Brittany under Gen. Hoche, who had been his father's friend, and in 1795 went back to Paris, and called on Gen. Bonaparte to obtain from him his father's sword, which had been taken away on the disarming of the sections subsequent to the 13th Vendémiaire. Bonaparte at once granted his request, and soon received a visit of thanks from Mme. Beauharnais, whom he married in 1796. In 1798 Eugène followed Bonaparte to Egypt, and was severely wounded at Acre. He returned to France with Bonaparte, was appointed to a captaincy in the consular guards, and after the battle of Marengo promoted to the rank of major. On the establishment of the empire he became a prince and colonel general of the chasseurs; in 1805 state arch-chancellor, grand officer of the legion of honor, and viceroy of Italy. On the occasion of his marriage with Augusta Amelia, daughter of the king of Bavaria, Napoleon invested him with the title of prince of Venice, and proclaimed him "his adopted son, and heir apparent to the crown of Italy." He was then only 24 years old, but showed at once great prudence and discretion. The Italian army was reënforced, and soon ranked among the best troops of the great empire; the fortresses and the coasts were put in a state of defence, uniform laws promulgated, facilities for public education increased, beggary suppressed by the establishment of asylums for the poor, and the cathedral of Milan completed. All this was accomplished without any addition to the taxes; never were the fiscal charges so moderate, and yet in 1813 the public treasury had a surplus of 92,000,000 livres, Italian. When the fourth Austrian war broke out, he was defeated by the archduke John in the battle of Sacile, April 16, 1809; but he soon took his revenge on the banks of the Piave, where he inflicted on the Austrians a loss of 10,000 soldiers and 15 pieces of cannon. Eugène pursued them into Carinthia, defeated them in several encounters, and joined the great French army in the plains of Austria. Then he invaded Hungary, and gained on June 14, near Raab, a victory over Archduke John, whose army was one third stronger than his own. Three weeks later he took an important part in the battle of Wagram. When his mother was divorced from Napoleon, Eugène as state arch-chancellor was obliged to announce the event to the senate. In 1812 he commanded one of the main divisions of the army which invaded Russia, and greatly contributed to the victory of Borodino. During the retreat from Moscow he was noted for his self-possession, firmness, and intrepidity, and the retreat he conducted from Posen to Leipsic, as commander-in-chief after the departure of Murat, has been considered as one of the most extraordinary war operations on record. Before leaving the army he contributed much to the victory of Lützen. Then he repaired to Italy, where in less than three months a new army amounting to 50,000 soldiers, was organized, and all the fortresses were prepared for defence. He defended Italy bravely against the allied forces, but was finally forced to yield, and retired to the court of his father-in-law in Bavaria. There he received, with the principality of Eichstädt, the title of duke of Leuchtenberg and first peer of the kingdom. He left two sons and four daughters. The eldest daughter, Joséphine, married Oscar, king of Sweden; the next, Eugénie Hortense, married the prince of Hohenzollern-Hechingen; and the

third, Amélie Auguste, became the wife of Dom Pedro I. of Brazil. Of the two sons, the elder, Auguste Charles, the first husband of Queen Maria of Portugal, died March 28, 1835; and the younger, Maximilian Joseph, who in 1839 married the grand duchess Maria, daughter of Czar Nicholas, died Nov. 1, 1852.

BEAUHARNAIS, Fanny, the familiar name of Marie Anne Françoise Mouchard, comtesse de Beauharnais, a French writer, born in Paris in 1738, died there, July 2, 1813. Her father was receiver general in the province of Champagne. She was married in 1753 to Count de Beauharnais, uncle of Alexandre, but soon separated from him and took up her residence in Paris. Here she devoted herself to literary pursuits, and made her rooms the rendezvous of many of the most prominent writers of the day. Her own writings, however, met with little success. Among them are several comedies, which failed in the theatres, a historical novel, and many poems.

BEAUHARNAIS, François, marquis de, a French royalist, brother of Alexandre Beauharnais, born at La Rochelle, Aug. 12, 1756, died March 4, 1846. He was a member of the states general. In 1792 he formed a plan for the flight of the royal family; but having failed in his attempt, he left France and was appointed major general under the prince of Condé. He was recalled to France on the occasion of his daughter's marriage with M. de Lavalette, and appointed director general of the post office, and in 1805 ambassador to Etruria and afterward to Spain; but Napoleon being dissatisfied with his services in Spain, he was recalled and sent into exile at Sologne. He returned to Paris on the restoration of the Bourbons, and was made a peer.

BEAUHARNAIS, Hortense Eugénie, wife of Louis Bonaparte and queen of Holland, born in Paris, April 10, 1783, died at Arenenberg, Switzerland, Oct. 5, 1837. She was the daughter of Alexandre Beauharnais and Josephine, afterward wife of Napoleon. On Jan. 3, 1802, in compliance with the wish of Napoleon, she became the wife of his brother Louis. The union was not a happy one. When her husband was made king she went to Holland with great reluctance. Louis abdicated in favor of his son in 1810, and she was appointed regent; but the emperor soon after annulled this arrangement, and united Holland with the empire. After her return to Paris Hortense lived apart from her husband, although the emperor would not allow them to be divorced, and is said to have led a dissolute life. Among her reputed lovers were the count of Flahaut, for whom she composed the popular air *Partant pour la Syrie*, and Admiral Verhuel, a Dutch naval officer, to whom is frequently attributed the paternity of Napoleon III. After the divorce of Josephine, Hortense remained on intimate terms with Napoleon, and had considerable influence with him. She alone, of all the Bonaparte family, remained in Paris on the restoration. After Waterloo she lived successively in Augsburg, in Savoy, and at her castle of Arenenberg, on the borders of Lake Constance, in Switzerland, where she devoted herself to the education of her children. In 1831 her sons Napoleon Louis and Louis Napoleon (the future emperor) became involved in the insurrectionary movements in Italy, and the elder died at Forli. After that she returned to Paris, and was considerately treated by Louis Philippe. She passed several years again in Switzerland, but was called from her retirement in 1836 by the arrest of Louis Napoleon at Strasburg. She interceded for him, and after his exile to the United States returned to Switzerland, where she was much admired for her talents and benevolence.

BEAUHARNOIS, a S. W. county of the province of Quebec, Canada, bounded N. W. by the St. Lawrence, and including Grand island; area, 200 sq. m.; pop. in 1871, 14,759. The Beauharnois canal, connecting Lake St. Louis with Lake St. François, runs through the N. border, and the Chateaugay river along the S. E. border. The chief staples are oats, wool, and dairy products. Chief town, Beauharnois, on Lake St. Louis, 18 m. S. W. of Montreal.

BEAUJOLAIS, a subdivision of the ancient province of Lyonnais, France, forming now the northern part of the department of the Rhône, and a small part of that of the Loire. After having formed an important separate barony, it came in 1400 into possession of the ducal house of Bourbon, was confiscated in 1523 from the great constable de Bourbon and united to the crown by Francis I., but subsequently given back to a nephew of the constable. In 1626 it came by marriage to the house of Orleans, in whose possession it remained until the revolution. It is noted for its fine vineyards. Its capital was Beaujeu.

BEAUMANOIR, Jean, sire de, a French knight, born in Brittany, lived about the middle of the 14th century. He was the friend and companion in arms of Du Guesclin, and distinguished himself in the civil wars of Brittany, fighting on the side of Charles of Blois against John of Montfort and the English. While in command of the castle of Josselin in 1351 he challenged Bemborough, the English commander at Ploërmel, to meet 30 French knights with 30 Englishmen at a place between the two castles known as Midway Oak. On the first onset the English excelled their adversaries; but Bemborough having been killed, the French renewed the struggle, and won the victory. This combat was long known as the battle of the thirty. At the battle of Auray, in 1364, Beaumanoir was taken prisoner.

BEAUMANOIR, Philippe de, a French jurist, born in Picardy, died in 1296. In 1280 he was bailiff of Clermont in Beauvaisis, which town was in the hands of Robert, son of Louis IX. and the head of the Bourbon family. It was according to directions from this prince that he digested and committed to writing the traditional law regulations of the

country. This book, *La coutume de Beauvoisis*, is one of the most valuable monuments of French law during the middle ages. It greatly contributed to reforming the excesses of the feudal system, and enforcing the paramount power of the monarch.

BEAUMARCHAIS, Pierre Augustin Caron de, a French dramatic author and speculator, born in Paris, Jan. 24, 1732, died there, May 19, 1799. He was the son of a watchmaker named Caron, and received his early education at a private school, which he left when only 13, after having shown remarkable precocity. His father desired him to study watchmaking; but he neglected his work to devote himself to music, for which he had an absorbing taste, and further annoyed his father by his somewhat dissolute habits. Threatened with severe punishment, however, he devoted himself for a time to his trade, and almost immediately achieved a great success by the invention of an improved escapement, which secured him the appointment of watchmaker to the court, then established at Versailles. Caron, now only about 23 years of age, attracted much attention in the court circle to which he was admitted, and acquired by his ability, personal beauty, and gallantry a position entirely disproportionate to his rank. In 1755 an old government official, Franquet, with whose young wife Caron had long stood in questionable relations, died; and the young watchmaker not only married his widow, but succeeded through court influence to his office. Less than a year after her marriage, Mme. Caron died after a very short illness; and her husband's many enemies took advantage of the rapidity with which her death followed that of Franquet to bring against Caron an accusation of poisoning, which he promptly disproved, but which was afterward several times revived in the less tangible form of a rumor, and formed a favorite court scandal. In 1757 Caron assumed the name of Beaumarchais; but he had no legal right to his title of nobility till 1761, when he purchased a commission as secretary to the king, a sinecure which conferred noble rank on its possessor. He still devoted much of his time to music, especially to playing the harp, in which instrument he made several improvements. His skill attracted the attention of the princesses Adelaide and Victoire, daughters of Louis XV., and he at once became a great favorite with them. Succeeding, through the influence thus acquired, in advancing certain schemes of the rich contractor Duverney, the latter admitted him to a share in his profitable mercantile ventures, which probably first gave him the passion for speculation that was afterward a distinguishing feature of his life. He now began the rapid accumulation of a fortune, and by way of further advancement he purchased a second office, that of vice president of the *tribunal de chasses*. In 1764 Beaumarchais went to Madrid where he had mercantile schemes in progress; but his visit is principally noteworthy on account of his revenge on Clavijo, the Spanish writer, who had broken a promise of marriage made to his younger sister. He not only compelled him to apologize, but succeeded in having him removed from his position at court, and prevented by decree from ever again holding any office under the crown. Goethe's drama of *Clavigo* has made this incident one of the most famous in the life of Beaumarchais. In April, 1768, he was married at Paris to a rich widow, Mme. Lévêque. Just before this marriage he had made his first important literary venture, in bringing out his play of *Eugénie*, but had met with no success. In 1770 he received a still greater rebuff in the failure of a second drama, *Les deux amis*. In the same year his second wife died, and the old stories of poisoning were revived against him. Duverney, the financier, also died in 1770, just after making a most advantageous contract with Beaumarchais. The contractor's heir contested this, and Beaumarchais found himself suddenly involved in a maze of lawsuits. He carried on the legal conflict for seven years, and won, after making some remarkable displays of oratorical power and wit, which rendered him famous even outside of France. It was during this memorable time, too, that he found leisure to produce his *Barbier de Séville*, written in 1772, and played, after several refusals from different managers, in January, 1775. No sooner had he extricated himself from the troubles just recounted than he became involved in a bitter quarrel with the duke de Chaulnes, his rival in the affections of an actress, who succeeded in having him illegally imprisoned for a time. Counsellor Goezmann had charge of his case, and, as the custom was, Beaumarchais sent Mme. Goezmann a present of money, which she promised to return in case her husband's report on the matter should be adverse to him. It so happened, but she returned only a part of the gift. Beaumarchais preferred an accusation of venality against Goezmann, and an extraordinary trial ensued, in which the accuser developed a most remarkable power of satire, eloquence, and skill, and, though he did not gain his end, made himself for a time the best known man in Paris. Two other somewhat scandalous trials followed, for Beaumarchais no sooner escaped one difficulty than he rushed into another. All this time he was involved in speculations: among them, one for the sale of timber from the forest of Chinon (just before Duverney's death), and one for supplying arms and munitions to the Americans, in their contest with England. As early as 1775 he had submitted to the king a memorial in which he insisted that the French government ought to assist the Americans, giving as his deliberate opinion that they would prove unconquerable. Beaumarchais passed a part of the year 1775 in England as an agent of the French ministry, had interviews with Arthur Lee, and was in the most intimate relations of correspondence with Vergennes.

His secrecy, his sagacity in interpreting a hint from a minister without forcing him to commit himself even verbally, his quickness of perception, and his social attractions, made him a convenient instrument. His papers served to fix the wavering purpose of the king, and when Maurepas, the chief minister, hesitated, Beaumarchais, by letters, representations, and adroit flattery, assisted to bring him to the decision which his own love of ease would have shunned. The French cabinet consented to help Beaumarchais in his plans to furnish the colonies with arms and ammunition. For that purpose they secretly advanced to him 1,000,000 livres, an equal sum being furnished by Spain, and delivered to him arms and ammunition from the public arsenals, on the condition that he would pay for or replace the same. Beaumarchais, under the firm of Roderique Hortalez and Co., as early as the beginning of 1777 forwarded three of his own ships, carrying 200 pieces of ordnance, 25,000 muskets, 200,000 lbs. of gunpowder, and other ammunition. He had also engaged more than 50 officers, who sailed on board the Amphitrite, his largest ship; and among the number were La Rouerie, Pulaski, and Steuben, who so powerfully aided in the success of the American troops. This first fleet safely arrived at Portsmouth, and inspired the colonists with renewed hope. Several other ships were sent out during the same year, and about the month of September Beaumarchais's disbursements amounted to more than 5,000,000 francs. Congress, being under the impression that these supplies were gratuitously furnished by the French government, under a disguised form, neglected to make remittances to Beaumarchais, who found himself in embarrassed circumstances, from which he was relieved by the French government advancing him another million of francs. The forwarding of supplies was continued, and toward the beginning of 1779 no less than 10 vessels sailed at once, but few of them reached their destination. At that time the United States were indebted to Roderique Hortalez and Co., or rather Beaumarchais, to the amount of more than 4,000,000 francs. Although congress did not hesitate to acknowledge its obligations toward the French firm, the settlement of so large an indebtment met with many difficulties, and it was not till 1835 that the final balance of about 800,000 francs was paid to the heirs of Beaumarchais. The transaction, far from having been profitable to the latter, as it has been frequently asserted, resulted in losses, which he was enabled to withstand through government aid and some more successful speculations. In an interval of his occupations, he produced in April, 1784, his *Mariage de Figaro*. Its production was vehemently opposed by the court, and the fact that it was played at all was a remarkable triumph for its author, to say nothing of its popular success. In 1785 he had a quarrel, famous at the time from the notoriety and caustic writings of both parties to it, with Mirabeau, on the questions connected with the introduction of water into Paris—an enterprise in which he was largely interested. This ended with only a war of words. In 1787 he produced *Tarare*, another play which failed utterly, but which Beaumarchais afterward claimed he had written in sympathy with the growing signs of the revolution, in his *Requête à MM. les représentants de la commune de Paris*, 1790. The events of 1789 found him just finishing a magnificent house not far from the Bastile, and about to begin what he hoped would be for him a period of quiet. He expressed sympathy with the ends of the revolution, but did not enter with enthusiasm into the means taken to attain them. For a time it seemed that he would succeed in keeping apart from public affairs; but his apparent apathy regarding much that happened, and a sale of arms to Holland, conducted by him solely as a speculation, but used against him by his enemies, threw him into disfavor, and finally caused him to leave the country. Soon after, and while he was in England and Holland, his enemies caused his name to be enrolled in the list of *émigrés* and his property to be confiscated. After many endeavors he finally succeeded in gaining permission to return to France, but could not recover his wealth, though he constantly petitioned the directory during the remainder of his life to restore it. On the morning of May 19, 1799, Beaumarchais was found dead in his bed, having been seized during the night by an attack of apoplexy.—Of the plays written by Beaumarchais, the *Barbier de Séville*, the *Mariage de Figaro*, and *La mère coupable* form a trilogy, being parts of a dramatic story, and properly standing in the order named. *Les deux amis* and *Tarare* are distinct dramas. All these works, with perhaps the exception of *Les deux amis*, are principally devoted to exceedingly witty attacks on the old régime, and to the promulgation of ideas called revolutionary at the time of their publication. Besides dramas, Beaumarchais wrote many able arguments and pamphlets connected with his suits at law, and a celebrated justification of his conduct, addressed to the convention, and called *Mes six époques*. He prepared, at enormous expense and great loss to himself, a complete edition of the works of Voltaire. His own works were published by Gudin de la Brenellerie (7 vols., Paris, 1809, and 6 vols., 1821–'7); and memoirs of his life have been written for that edition and as a separate work by Cousin d'Avallon (*Vie privée, publique et littéraire de Beaumarchais*, Paris, 1802). See also *Beaumarchais et son temps, Études sur la société française*, &c., by Louis Léonard de Loménie (2 vols., Paris, 1856; 2d ed., 1858).

BEAUMELLE, Laurent Angliviel de la, a French author, born at Valleraugue, department of Gard, Jan. 28, 1726, died in Paris, Nov. 17, 1773. He became professor of belles-lettres at Copenhagen, and while there wrote *Mes pen-*

sées. Something in this work greatly displeased Voltaire, and when La Beaumelle returned to France he was arrested at his instigation, and confined for six months in the Bastile. Restored to liberty, he wrote a very witty pamphlet in answer to an attack directed against him by Voltaire during his captivity, in the supplement to the *Siècle de Louis XIV.*, and then devoted himself to the composition of his *Mémoires pour servir à l'histoire de Madame de Maintenon*, which was published in 1756, and received with marked favor. He was arrested a second time, and confined again for more than a year in the state prison, where he made a translation of Tacitus. Some time afterward his warfare with Voltaire was renewed, and La Beaumelle displayed such tact, energy, and wit, that he sometimes got the better of his powerful rival. At last, in 1770, he obtained permission to return to Paris, where he received an appointment as assistant in the royal library, and afterward a pension. At the time of his death he was engaged on an edition of Voltaire's works, with notes, of which only one volume, the *Henriade*, was finished. Voltaire caused it to be suppressed, but there is an edition by Fréron, with changes (1775).—His son, Victor Laurent Suzanne Moïse (born in 1772, died in Rio Janeiro in 1831), served as colonel of engineers in the army of Dom Pedro, and published an interesting pamphlet on the Brazilian empire, besides several tracts on the war with Spain.

BEAUMONT, a town of France, in the department of Ardennes, on the left bank of the river Meuse, 10 m. S. E. of Sedan; pop. 1,306. It is celebrated for the battle fought in its neighborhood Aug. 30, 1870, between the French forces under Marshal MacMahon and the German army under the crown prince of Saxony; the object of the German commander being to prevent the junction of the marshal's troops with those of Marshal Bazaine, then shut up in Metz. The battle opened with the surprise and rout of the French fifth corps, in front of Beaumont. Two other corps were soon engaged. After a severe struggle the Prussians took the town, and drove their opponents across the Meuse, entirely defeating them. By this victory the great end was gained of enabling the Prussian crown prince to reënforce with his command the corps under the prince of Saxony; a combination so strong as to compel the immediate surrender of the French at Sedan.

BEAUMONT, Élie de. See Élie de Beaumont.

BEAUMONT, Sir **George Howland,** an English patron of art, born at his family seat in Leicestershire, Nov. 6, 1753, died Feb. 7, 1827. He was educated at Eton, and subsequently devoted himself with enthusiasm to the study of painting and to the collection of works of art. He was among the first to discover and encourage the genius of Wilkie, some of whose finest works were painted for him. He was instrumental in establishing the British national gallery, and, as an inducement to parliament to purchase the celebrated Angerstein collection for that purpose, presented 16 of his best pictures to the collection.

BEAUMONT, Sir **John,** an English poet, born in 1582, died in 1628. He was the elder brother of Francis Beaumont, the dramatist, and published first a poem on Bosworth Field, and then a small volume of poems, remarkable for their high moral tone. He also wrote a poem called "The Crown of Thorns," in 8 books, which is lost. Winstanley, in his "Honor of Parnassus," describes Sir John Beaumont as one of "the great souls of numbers."

BEAUMONT, William, a surgeon in the U. S. army, born at Lebanon, Conn., in 1796, died in St. Louis, April 25, 1853. He is principally noted for his discoveries regarding the laws of digestion resulting from his experiments upon the body of Alexis St. Martin. In 1822 Beaumont was stationed at Michilimackinac, Michigan. On June 6 St. Martin, a young man 18 years of age, in the service of the American fur company, was accidentally shot, receiving the whole charge of a musket in his left side, from a distance of about one yard, which carried with it portions of his clothing, fractured two ribs, lacerated the lungs, and entered the stomach. Dr. Beaumont restored him in a year to good health, with his former strength and spirits, though the aperture in his body was never closed. In 1825 Dr. Beaumont commenced a series of experiments upon the stomach of St. Martin, studying its operations, secretions, the action of the gastric juices, &c.; these experiments he renewed at various intervals until his death, his patient during so many years presenting the remarkable spectacle of a man enjoying good health, appetite, and spirits, with an aperture opening into his stomach through which the whole action of the organ might be observed. The result of his experiments was published by Dr. Beaumont in 1833. He was thus the first who actually obtained the gastric juice in the human subject, and demonstrated beyond a doubt its chemical properties and digestive powers. Previous to his time Réaumur in 1752, Stevens in 1777, and Spallanzani in 1787 had given evidence to show that digestion must be accomplished in the stomach by means of a solvent fluid, and some experimenters had even detected certain of the ingredients of this fluid. But Dr. Beaumont first obtained the gastric juice in considerable quantity, and showed that it had the power, outside the body, at proper temperatures, of liquefying and dissolving various articles of food. St. Martin is still living (1872) in Oakdale, Mass.

BEAUMONT AND FLETCHER, two English dramatists and poets, whose names are inseparably connected by the fact that they produced their works jointly, and, without indicating the parts written by each, published them under their united names.—Francis Beaumont, born at Gracedieu, Leicestershire, about 1585, died in 1615. He was the son of a

judge of the common pleas, and a member of a family which had held important state offices for several generations. In 1697 he entered Oxford, and on taking his degree became a student of law in the Inner Temple. But he neglected his profession for literary pursuits, in which he became almost immediately associated with Fletcher. Of Beaumont's personal history there is little record. He married (in 1613, it is believed) Ursula, daughter of Henry Isley, of Sundridge, Kent, and had two daughters, who appear to have survived him. He died when not quite 30 years old, and was buried in Westminster. The idea hinted at in an epitaph written by Bishop Corbit, and in a stanza by Beaumont's brother, that he had caused his early death by too great literary labor, seems a very probable one when we consider the long list of works to each of which he must have contributed very largely. The only writings which he is believed to have produced alone are the "Masque of the Inner Temple and Gray's Inn," and the minor poems in the collection of his and Fletcher's works, with one exception, Fletcher's "Honest Man's Fortune," accompanying the play with the same title.—JOHN FLETCHER, born in 1576, died in London in 1625. He was the son of Richard Fletcher, a prominent ecclesiastic who was dean of Peterborough, and afterward successively bishop of Bristol, Worcester, and London. He received his education at Cambridge, but of his personal history after his graduation almost nothing is known. No record of his marriage has been found, and as he lived as a bachelor with his friend Beaumont until the latter took a wife, at which time Fletcher was nearly 40, there is a fair presumption that he died unmarried. The slight clues we possess to his story seem to show that he spent most of his life in London, among a company of literary men who, as was apparently the case with him also, wrote for bread, and assisted each other in both pecuniary and literary matters, forming a kind of brotherhood. Allusions in Beaumont's "Letter to Ben Jonson" show that he and Fletcher were among the circle of wits of the famous Mermaid tavern.—The collected works of the two poets consist, besides the writings named above as attributed to Beaumont exclusively, of 52 plays. Of these Fletcher is considered by good authorities to have written 18 unaided, probably either before Beaumont joined him or after the latter's death. The chief among those which were the joint productions of the two friends are "The Maid's Tragedy" (represented about 1610, and often considered the best of all their dramas), "King and No King," and "Philaster." Of those considered the sole work of Fletcher, "The Faithful Shepherdess" is especially famous for the grace and delicacy of its verse. The plays are somewhat disfigured for modern readers by the licentious language which the time of their production permitted; but they abound in strong and beautiful conceptions, and in examples of a literary style which has been held superior to that of Ben Jonson, and has even given rise to an ingeniously defended theory that Shakespeare aided in composing two or three of the dramas.

BEAUMONT DE LA BONNIÈRE, Gustave Auguste de, a French advocate and writer, born in the department of Sarthe, Feb. 16, 1802, died at Tours, March 2, 1866. In 1831 he was sent with Alexis de Tocqueville to the United States to make inquiry into the penitentiary system; and the result of their visit was a report, *Du système pénitentiaire aux États-Unis et de son application en France*. Besides this work, Beaumont produced a kind of novel, *Marie, ou de l'esclavage aux États-Unis*, which has been translated and reprinted in this country. In 1839 he published *L'Irlande politique, sociale et religieuse*, which was rewarded, as well as the preceding work, with the Monthyon prize of the French institute. In 1840 Beaumont was elected to the chamber of deputies, sided with the so-called dynastic opposition, and favored electoral reform in 1847. In the constituent assembly in 1848 he was a member of the committee on foreign affairs. Gen. Cavaignac appointed him ambassador to England, which position he resigned on the election of Louis Napoleon as president. He was elected to the legislative assembly, where he did not play a conspicuous part, and after the *coup d'état* of December, 1851, he lived in retirement. In 1836 he married his cousin, a granddaughter of Gen. Lafayette.

BEAUNE, an old town of Burgundy, France, department of Côte d'Or, 23 m. S. S. W. of Dijon, at the foot of a hill which produces excellent wine; pop. in 1866, 10,907. Its most remarkable public buildings are the church of Notre Dame, founded by Duke Henry of Burgundy in 976, and the hospital, founded by Chancellor Rollin in 1443. Before the revocation of the edict of Nantes Beaune was among the leading manufacturing cities of eastern France; it still produces cloth, cutlery, leather, vinegar, casks, &c., but its actual importance is mostly derived from its wine trade, which is considerable. It was anciently fortified. Early in 1871 the town was repeatedly occupied by the Germans under Gen. Von Werder.

BEAUNE-LA-ROLANDE, a village of France, in the department of Loiret, on the road leading from Montargis to Pithiviers, on the northern edge of the forest of Orleans; pop. in 1866, 1,962. On Nov. 28, 1870, a battle was fought here between the 10th German army corps, belonging to the army of Prince Frederick Charles, and the French army of the Loire, under Aurelle de Paladines. The latter, who were the assailants, sustained a loss of 7,000, and fell back to their fortified lines before Orleans.

BEAUREGARD, Pierre Gustave Toutant, an American general, born near New Orleans about 1817. He graduated at West Point in 1838. In the Mexican war he earned the brevet rank

of captain at Contreras and Churubusco, and of major at Chapultepec, where he was twice wounded. In 1853 he was made captain in the corps of engineers. From 1849 to 1860 he was stationed mainly at New Orleans, where he had the general charge of the construction of the mint, custom house, and marine hospital, as well as of the engineering operations on the lower Mississippi and the gulf. In January, 1861, he was appointed superintendent of the military academy at West Point; but in less than a month he resigned his commission in the army, and received the rank of brigadier general from the southern confederate government. He conducted the attack upon Fort Sumter, and was afterward sent to Virginia, where he virtually commanded at the battle of Bull Run; Gen. J. E. Johnston, who outranked him, having just come upon the field, and adopting his plan of operations. In the spring of 1862 he was sent to the west as second in command of the department of Tennessee. Gen. A. S. Johnston having been killed early in the battle of Shiloh, or Pittsburgh Landing, April 6, Beauregard took the command, and gained a considerable success; but the next day, Gen. Buell having in the night joined Gen. Grant, he was worsted and forced to abandon the field. He retired to the fortified position at Corinth, which he strengthened and held against Gen. Halleck to the end of May. His health soon after failing, he was for a time relieved from active service, but was afterward placed in command at Charleston, which he successfully defended throughout the year 1863, repelling the attacks under Gen. Gillmore and Admiral Dahlgren. In 1864, when Grant was approaching Richmond, Beauregard held Petersburg until the arrival of Lee at Richmond, speedily checking the advance of Gen. Butler. In the autumn of 1864 he was placed in command of the department of the west, and made strenuous but unavailing efforts to prevent Sherman's march to the sea. After the close of the war, in which he attained the highest rank in the confederate service, that of full general, he took up his residence at New Orleans.

BEAUREPAIRE-ROHAN, Henri de, a Brazilian traveller, of French origin, born in Picardy about 1818. He explored Paraguay in 1845–'6, visited Bonpland at Borja, and published *Descripção de uma viagem de Cuyaba ao Rio de Janeiro* (Rio, 1846). Promoted in 1850 to the rank of major of engineers, and charged by the government with the exploration of central Brazil, he has since published several new works on the geography and history of parts of that empire.

BEAUSOBRE, Isaac de, a French Protestant theologian, born at Niort in Poitou in 1659, died in Berlin in 1738. He studied theology at the academy of Saumur, and was ordained by the synod of Loudun in 1683. He assumed the charge of the Calvinist church at Châtillon-sur-Indre, and was obliged to close his place of worship upon the revocation of the edict of Nantes in 1685, but continued to hold meetings of his congregation at his own house until threats of imprisonment compelled him to leave France. He took refuge in Holland, where he was appointed private chaplain to the princess of Anhalt-Dessau, a daughter of the dowager princess of Orange. On the death of the husband of his patroness, he changed his residence to Berlin in 1694, and was appointed pastor of a French Protestant church there, and in 1707 a member of the consistory, a position which he held till his death. He also acted for many years as inspector of the French schools and churches of the city. He was the principal contributor to the *Bibliothèque allemande*, begun in 1720, of which 50 volumes were published, and was one of the editors of the *Journal d'Allemagne, de Suisse et du Nord* (new ed., 2 vols. 8vo, the Hague, 1741–'3). He wrote a "Defence of the Doctrines of the Reformers" (1694); an unfinished history of the reformation (Berlin, 1785; translated into English, 1802); with L'Enfant, a French translation of the New Testament (Amsterdam, 1718), and two volumes of commentaries upon it. Among his numerous historical and theological works of less importance are his *Histoire de Manichée et du Manichéisme* (Amsterdam, 1734–'9), and *Supplément à l'histoire des Hussites* (Lausanne, 1745). His sermons were collected and published after his death (3d ed., 4 vols., Lausanne, 1758).

BEAUTEMPS-BEAUPRÉ, Charles François, a French hydrographer, born at Neuville-au-Pont, near Ste. Menehould, in 1766, died in 1854. He studied engineering and geography at the depot of marine charts and plans, of which his cousin Buache was the chief. At the early age of 19 he was made a government engineer, and received a commission to revise the charts of the "Neptune of the Baltic." He was rapidly promoted, and in 1791 acted as first hydrographer to the expedition sent out under D'Entrecasteaux to search for La Pérouse. He made a very accurate and valuable set of charts of all the regions visited by the fleet. On his return in 1796 he completed his *Atlas de la Baltique*, begun some time before, and at the order of the government prepared a general hydrographic chart to be used by the French expedition then about to circumnavigate the globe. He was now promoted to the position of assistant to the chief of the marine department, and for six years constantly labored in connection with the surveys undertaken by this branch of the service. He made during this period many of the most valuable of the French charts—among them those of the E. coast of the Adriatic. In 1810 he was chosen a member of the institute. In 1811 he made valuable hydrographic surveys of the coast near the mouth of the Elbe; and the German engineers recognized his service to science by making him in 1816 a member of the royal society of Göttingen. In 1814 he was ap-

pointed chief of his department. In 1815 he made a complete survey of the coasts of France, one of the most valuable works of his life. The works above named are those by which he is best known; the remainder of his life was devoted to their constant revision and improvement, and to the duties of his department. He also edited *Le pilote français*, the sixth volume appearing in 1844. He was called in England "the father of hydrography."

BEAUTY. See ÆSTHETICS.

BEAUVAIS (anc. *Cæsaromagus*), a city of France, capital of the department of Oise, situated on the Thérain, 40 m. N. by W. of Paris; pop. in 1866, 15,307. When the Romans invaded Gaul, it was the chief town of the Bellovaci. It became early the seat of a bishopric, the holder of which was one of the 12 peers of France under the Capetian kings. The English made an unsuccessful assault on the city in 1433, but they held the surrounding country, and it was Pierre Cauchon, bishop of Beauvais, who pronounced the sentence of death upon Joan of Arc. In 1472 the city, being besieged by Charles the Bold, duke of Burgundy, was courageously defended by its inhabitants, among whom a woman, Jeanne Lainé, celebrated under the name of Jeanne la Hachette, distinguished herself by her intrepidity. Her statue was set up in the city in 1851. The ancient ramparts have been partly levelled and converted into promenades. The cathedral is one of the largest in France, and its choir is a masterpiece of Gothic architecture; the church of St. Étienne is a fine specimen of the renaissance style, and contains famous sculptures and stained windows. The abbey church, prior to the revolution, contained statues of all the Merovingian kings. The city has important manufactures, especially in silks, carpets, and tapestries.

BEAUVAIS, Charles Théodore, a French general, born in Orleans, Nov. 8, 1772, died in Paris in 1830. He entered the army as a private, rose rapidly to the rank of adjutant general, went to Egypt with Bonaparte, but resigned on account of some disagreement with his chief, and while returning to France was made prisoner by a corsair and taken to Constantinople, where he was detained for 18 months. He reëntered the army in 1809, served in Spain, was afterward sent to the Rhine, commanded at Bayonne in 1815, and was dismissed on the second return of the Bourbons. He then devoted himself to literary pursuits, compiled a popular publication, *Victoires et conquêtes des Français* (28 vols., 1817 *et seq.*), and edited the *Correspondance officielle et confidentielle de Napoléon Bonaparte avec les cours étrangères* (7 vols. 8vo, 1819–'20).

BEAUVAU, de, an ancient French family of Anjou.—RENÉ aided Duke René of Anjou in the conquest of Naples, and was mortally wounded at the battle of Benevento in 1266.—LOUIS cooperated in the reconquest of Normandy from the English, 1449–'50, and died in 1462.—BERTRAND, who died in 1474, was one of the counsellors of Charles VII. and Louis XI., and was frequently employed in diplomatic missions.—RENÉ FRANÇOIS, born in 1664, was bishop of Tournay, and during the siege of that city by Prince Eugene was distinguished for his charity. He was president of the states of Languedoc over 20 years, and patronized many learned publications relating to that part of France. He died Aug. 4, 1739.—CHARLES JUSTE, born at Lunéville, Sept. 10, 1720, distinguished himself at the siege of Prague in 1742, and in various subsequent engagements, especially at Corbach in 1760. He became a member of the academy, governor of Provence, and marshal, and was for five months in 1789 a member of the cabinet of Louis XVI. He died May 2, 1793.

BEAUVOIS, Ambroise Marie François Joseph Palisot de. See PALISOT.

BEAUZÉE, Nicolas, a French grammarian, born in Verdun, May 9, 1717, died in Paris, Jan. 23, 1789. Declining employment under Frederick the Great, he succeeded Dumarsais in preparing grammatical articles for the great *Encyclopédie*, which, together with those of Marmontel, were separately published in 1789 (3 vols., Liége), under the title of *Dictionnaire de grammaire et de littérature*. In the latter part of his life he was professor at the royal military school in Paris. His most important work is *Grammaire générale* (2 vols., 1767; new ed., 1819). Among his other works are translations of Sallust (1770) and of the "Imitation of Jesus Christ" (1788).

BEAVER (*castor*, CUV.), a fur-bearing amphibious animal, of the rodent or gnawing order (*rodentia*). The beaver has the head compressed, with an unbroken line of profile from occiput to muzzle; 2 large incisors and 8 molars in each jaw, with large and powerful muscles regulating the movements of the inferior jaw; eyes disproportionately small and vision of short range; ears small, but hearing very acute; sense of smell powerful; body short between the fore and hind legs, broad, heavy, and clumsy; length when full grown, from tip of nose to end of tail, 3 ft. 6 or 8 in.; weight from 30 to 60 lbs.; color reddish (in some localities yellowish) brown, in rare instances black, and a few albinos or white beavers have been found. The fore feet of the beaver are digitigrade, and the hind ones plantigrade. The paws are small in proportion to the animal, and compared with the hind feet; in swimming they are not used, and are folded under the body; but they are capable of some rotary movement, which enables the beaver to handle and carry sticks, limbs of trees, mud, and stones, and to use his paws as hands while sitting up or walking on his hind legs. The hind legs are the propelling power in swimming, and the feet are fully webbed to the roots of the claws. The most conspicuous organ, the tail, is from 10½ to 11½ in. long, 5½ in. broad,

nearly flat, straight, and covered for the length of 9 or 10 in. with black horny scales, and is attached by strong muscles to a posterior projection. The common error that the tail is the beaver's trowel is confuted by the fact that the animal always uses mud and soft earth as mortar; but it serves as a pounder to pack mud and earth in constructing lodges and dams, is used in swimming as a scull, elevates or depresses the head, turns the body, assists in diving, and by striking a powerful blow, the report of which can be heard at the distance of a half mile, it gives an alarm; while the strong muscles enable the beaver when standing erect to use the tail as a prop. Beavers are monotremes, and dissection is necessary to distinguish the sex. The female brings forth from 2 to 6 young in May, and weans them in 6 weeks. The period of gestation is from 12 to 16 weeks, and the beaver lives from 12 to 15 years. Water is the natural element of the beaver, and its movements on land are awkward and slow. For commercial purposes, besides its fur, the beaver furnishes castoreum, a secretion used in medicine as an anti-spasmodic, and its flesh is much esteemed as food by trappers and Indians.—The beaver is social, pairs and brings up a family to maturity, and sometimes two or more families inhabit the same pond. The common supposition that beavers live in villages or colonies is erroneous. All the inhabitants may assist in constructing or repairing the common dam, but each family has its own lodge and burrows, and lays in its own supply of provisions for the winter. As their work is carried on by night, little is actually known of their method except from the examination of what they effect. They only build dams when they have chosen the site of their settlements on running streams which do not afford a sufficient depth of water to be secure against freezing in winter; and this they do by cutting down trees, invariably up stream of the place selected for their weir, so that the current may bear them down toward the site. The trees which they thus cut down with their fore teeth are often five or six inches in diameter. Where the current is gentle, the dam is carried horizontally across; but where the water runs swiftly, it is built with an angle or convex curve up stream. These materials rest on the bottom, where they are mixed with mud and stones by the beavers, and still more solidly secured by the deposit of soil carried down by the stream, and by the occasional rooting of the small willow, birch, and poplar trees, which they prefer for their work, in the soil at the bottom. Their houses or lodges, seldom made to contain more than four old and six or eight young beavers, are very rudely built; sticks, stones, mud, and all the materials used in constructing the dam, are piled horizontally, with no method beyond that of leaving a cavity in the centre. There is no driving in of piles, wattling of fences, and mud plastering, as described; and when leaves or grass are interwoven, it is done casually, not to bind the mortar, as men apply hair for that purpose. The beaver conveys the materials between his fore paws and chin, arranges them with his fore feet, and when a portion is placed as he wishes it, he turns about and gives it a slap with his tail. In the breeding season, and in early summer, the beavers do not live in their houses, nor in communities, but only become gregarious in the winter, and when preparing for it. They begin to build ordinarily in the latter part of August, although they sometimes fell their timber earlier in the summer; but their houses are not finished and plastered until late in the season, when the freezing of the mud and water as the material is laid on adds much to the security of the beavers against the wolverene or glutton, which, with the exception of man, is their worst enemy. The food of the beaver consists of the bark of the aspen, willow, birch, poplar, and alder, of which it lays up in summer a stock for the winter, on the bank opposite its lodges; but unless compelled by necessity, it avoids the resinous evergreens, such as the pine and hemlock. The beaver is easily domesticated, and be-

Beaver.

Beaver Lodges and Dam.

comes very tame.—The habitat of the American beaver formerly extended from the Arctic sea to the gulf of Mexico; they were found in the greatest number near Hudson bay, on the shores of Lake Superior, at the head waters of the Mississippi, and on the Yukon, Mackenzie, Frazer, and Sacramento rivers. During the colonial period beavers were abundant in New England, New York, to some extent in the Canadas, and on the margins of rivers throughout the south; they are still seen, but rarely, in Maine, New York, and Virginia. Colonization, which the beaver, hunted for its fur, in no small degree induced in some regions, contracted its habitat; later trapping and hunting has completely exterminated the animal in regions where it once was abundant, and it is now found only in the Hudson Bay territory, in the Canadas, in upper Michigan, on the upper Missouri, and to some extent in Washington, Nevada, California, and Oregon. The colonists and the Indians pursued the beaver hunt with such rapacity as to exterminate the animal in regions within reach, and as early as 1700 beaver skins were no longer exported from New England, New York, and the middle states. Settlement and hunting at the west have driven beavers within a narrower circle; and the hunter's ingenuity in traps and scent baits, with a knowledge of the habits of the animal, soon results in the capture of nearly every beaver in the hunted region. The trapping season begins in November and ends in March, but the hunt is pursued throughout the year, in spring, summer, and fall on the dams, and in winter through the ice. A trapper manages from 50 to 70 traps in a circuit of 30 or 40 miles; and on the S. shore of Lake Superior an Indian family of four good trappers will take from 75 to 150 beavers in a season. Of late years the substitution of silk for fur for hats, and the consequent decline in the value of the skins, have caused a relaxation of the hunt and some increase in the numbers of the animal on the upper Mississippi and around Lake Superior. A regulation of the Hudson Bay company compels an interval of five years in a beaver district after a season's hunt before trapping is resumed; but it is not possible for the beaver to recover its former numbers in any region. There was, however, an increased activity in trapping and in the trade in 1871, occasioned by use of the fur in Russia and on the continent for trimmings for ladies' wear, and for men's gloves and collars; and in January, 1872, there was an advance of 35 per cent. over the prices in 1871. The extent of this fur trade may be estimated from the following statistics: In 1624 the Dutch West India company began the trade in America by exporting from New Amsterdam 400 skins; from 1625 to 1635, 81,183 skins were exported; in 1743 the Hudson Bay company exported 150,000 skins; during the years 1854, 1855, and 1856 this company sold in London 627,655 beaver skins, a portion of the first sales being the accumulation of previous years. In 1871 the London sales of the Hudson Bay company were 124,538 skins, but probably the entire sales abroad were 150,000 skins, to which must be added 25,000 skins in the United States, making the production for the year in the United States, at Hudson bay, and on the Columbia river, 175,000 skins. From January 1 to March 6, 1872, the Hudson Bay company sold in three auctions in London 35,510 skins. During the Dutch occupation of New Amsterdam pelts were worth about $2 25, and were used as part of the currency; in 1820 on the upper Missouri beaver skins were worth $7 and $8 per pound; in the same locality in 1862 they brought $1 25, and in 1868 $2 per pound. In 1872 the price in London was from 10*s.* to 34*s.* per skin, according to color and size, and $4 gold for the best skins in the United States; for cub skins 3*s.* to 4*s.* sterling. The large skins weigh from 1½ to 2 lbs.—The European beaver was once found in the British islands, in all parts of the continent, in Siberia, and in Asia Minor. It is now extinct, except in rarely found solitary pairs on some of the rivers, such as the Rhine, Rhône, and Danube, and in Siberia. The European is a larger animal than the American beaver, with a paler-colored fur; and, though probably not a distinct species, its habits are different. It is solitary, not gregarious, and generally lives in burrows instead of constructing lodges and dams.—See "The American Beaver and his Works," by Lewis H. Morgan (8vo, Philadelphia, 1868).

BEAVER. I. A W. county of Pennsylvania, bordering on Ohio, and intersected by the Ohio and Beaver rivers; area, 650 sq. m.; pop. in 1870, 36,178. The soil near the streams is remarkably fertile. The surface is undulating, and in some places covered with extensive forests. Bituminous coal and limestone are abundant. The Pittsburgh, Fort Wayne, and Chicago, and the Pittsburgh and Cleveland railroads traverse the county. The chief productions in 1870 were 174,508 bushels of wheat, 59,800 of rye, 414,233 of Indian corn, 532,625 of oats, 21,540 of barley, 193,425 of potatoes, 30,224 tons of hay, 936,107 lbs. of butter, and 421,907 of wool. There were 5,882 horses, 7,901 milch cows, 6,702 other cattle, 98,300 sheep, and 12,092 swine. Capital, Beaver. **II.** A S.W. county of Utah, bordering on Nevada, and intersected by Sevier river; area, about 3,500 sq. m.; pop. in 1870, 2,007. The Wahsatch mountains lie along the E. border, and a portion of Preuss lake is in the N. W. part. There is some good farming land, and deposits of iron, lead, and silver are found, and have been somewhat mined. Capital, Beaver City.

BEAVER, Philip, an English navigator and philanthropist, born Feb. 28, 1760, died at the Cape of Good Hope, April 5, 1813. He served in the royal navy during the war of the American revolution, and after the peace organized an association to found a colony in Africa for

cultivating the soil by free labor and civilizing the negroes. He left England April 13, 1792, with three ships and 275 white colonists, for Bulama island, on the W. coast of Africa. The expedition proved a failure. Within four months more than a third of the colonists had died by fever, and more than half the survivors returned to England. Beaver himself, though often prostrated by fever, persevered in the enterprise; but, unable to revive the spirit of the colonists, he departed with them for Sierra Leone, Nov. 29, 1793, and in May, 1794, reached England with only one of his original companions. The shareholders of the association, in spite of their losses, presented him with a gold medal for his disinterested and resolute conduct. He published a narrative of his experiences entitled "African Memoranda." Subsequently he distinguished himself under Abercrombie in Egypt in 1801, and in the capture of the Isle of France in 1810. In 1813 he cruised in the Indian ocean in command of the frigate Nisus.

BEAVER HEAD, a S. W. county of Montana territory, separated on the S. and W. from Idaho by the Rocky mountains and bounded N. by the Big Hole mountain; area, 4,250 sq. m.; pop. in 1870, 722. Affluents of Jefferson river, one of the head streams of the Missouri, take their rise in this county. The surface is very mountainous. The county contains three quartz mills for the production of gold and a saw mill. Capital, Bannock.

BEAVER INDIANS, a branch of the Chipewyans, belonging to the Athabascan family. They inhabit a beautiful district on the Peace river, and are allied with the Mauvais Monde. Their dialect differs somewhat from the Chipewyan. They are gay, improvident, and given to gambling.—A tribe of the Algonquin family, called in early French accounts Amikouek or Beaver Indians, lay north of Manitouline island on the banks of Lake Huron. They were also called Nez Percés, a name subsequently given to an Oregon tribe.

BEAVER ISLANDS, a group in Lake Michigan, near its N. extremity, and having one island of considerable extent (40 sq. m.), called Big Beaver. After their expulsion from Nauvoo, a dissenting branch of the Mormons established themselves there under Joseph Strang.

BEAZLEY, Samuel, an English architect and author, born in London in 1786, died at Tunbridge castle, Kent, Oct. 12, 1851. He erected three great theatres in London, two in Dublin, and three in the provinces, besides remodelling several, and supplying drawings for theatres in India, Belgium, and Brazil. He wrote over a hundred dramas, and two novels, "The Roué" and "The Oxonians."

BEBEERINE, or **Bebeeria,** an alkaloid, having the formula $C_{38}H_{22}NO_6$, obtained from the bebeeru bark or bark of *nectandra Rodiei*. This tree belongs to the family *lauraceæ*, and inhabits Guiana and neighboring regions of South America. The alkaloid is also found in the *buxus sempervirens* or common box. The impure sulphate, which is commonly used, occurs in small dark brown translucent scales. It is supposed to resemble quinia in its properties, and has been used in the same class of diseases. In antiperiodic power it probably ranks among the vegetable bitters as next, though far inferior, to quinia.

BÉBIAN, Roch Ambroise Auguste, a French teacher of deaf mutes, born on the island of Guadeloupe in 1789, died there in 1834. He was the son of a merchant and the godson of the abbé Sicard, under whose direction he qualified himself for his task. He published in 1817 an *Essai sur les sourds-muets et sur le langage naturel*, and afterward became a professor at the royal institution, where he excited so much jealousy by his zeal for reform that he was induced in 1825 to resign and return to Guadeloupe. Among his writings are: *Mimographie, ou Essai d'écriture mimique* (1822), and *Manuel d'enseignement pratique* (1827). The academy awarded him a prize for his *Éloge historique de l'abbé de l'Épée.*

BEBUTOFF, Vasili Osipovitch, prince, a Russian soldier, born in 1792, died in Tiflis, March 22, 1858. His family, originally Armenians, acquired distinction in Georgia. He joined the army of the Caucasus in 1809, served in 1812 against the French, and subsequently took part in the subjugation of a part of Daghestan. In 1825–'7 he was governor of Imeretia, and in 1828 fought bravely against the Turks under Paskevitch; and he was made major general for storming Akhaltzikh and holding that fortress in March, 1829, for ten days, against superior Turkish forces, until relieved by Muravieff. Appointed governor of the new Russian province of Armenia, he concluded in 1835 a boundary treaty with Persia, and was in 1838–'40 a member of the Transcaucasian administration in Tiflis. In October, 1846, he defeated Shamyl; and in November, 1847, he became president of the Transcaucasian administrative council. On the outbreak of the Crimean war he was placed in command of the army of observation on the frontier, and by routing the Turks near Kadiklar, Dec. 1, 1853, he prevented their invasion of Russian Armenia. He achieved a decisive victory near Kuruk-Dereh, Aug. 5, 1854, over Zarif Pasha with 40,000 men, an army more than twice as large as his own; but failing to follow up his advantage, he was superseded in 1855 by Muravieff, and detailed for the covering of Georgia, where, on hearing of Omar Pasha's arrival in Mingrelia, he lost no time in forcing him to retreat. In 1856 he succeeded Muravieff as commander-in-chief until the arrival of Bariatinsky. He was made general of infantry in January, 1857.—Two of his brothers fell on the battlefields of the Caucasus. His third brother, David, fought under Paskevitch in Poland and Hungary, and before Silistria as commander of the Caucasian cavalry regiment, became lieutenant general in 1856, and was military commander of Warsaw from 1861 till his death there, March 23, 1867.

BECCAFICO (Ital., fig-pecker), the *sylvia hortensis*, a singing bird which feeds upon insects, figs, currants, and other fruits. It belongs to the order of *sylviadæ* (warblers), and is found in some English and even Scotch counties, but chiefly in southern Europe. It has a voice like a nightingale, lurks shyly in the thickest

Beccafico (Oriolus galbula).

foliage, and flies with singular grace. It was eaten with much delight by the ancient Romans, and still is one of the most delectable morceaux on Italian, Grecian, and French tables, especially in Venice. An annual feast made on beccaficos is called *beccaficata*. The term beccafico is applied in continental Europe, rather indiscriminately, to different kinds of sylvan warblers, when they are fat and in condition for the table.

BECCAFUMI, or **Mecherino, Domenico,** an Italian artist, born at Siena in 1484, died in Genoa, March 18, 1549, or according to Lanzi after 1551. He began life as a shepherd, amusing himself in drawing figures of his flock upon the sand. Beccafumi, a patron of art, was struck by his talent, and attended to his education; and he adopted the name of his benefactor, though he occasionally used his real name of Mecherino. He studied in Venice and Rome, and on his return to Siena he executed bronze statues and bass reliefs. His most celebrated work is the mosaic pavement of the Siena cathedral.

BECCARIA, Cesare Bonesana, marquis of, an Italian jurist and economist, born in Milan, March 15, 1738, died there, Nov. 28, 1794. He attended the Jesuits' college in Parma and afterward studied philosophy and mathematics. Under the patronage of Count Firmian, governor of Lombardy, he established a literary society in Milan and a periodical, *Il Caffè* (1764–'5), in which he published (1764) his *Dei delitti e delle pene*, which was revised by him and by Pietro Verri (2 vols., Venice, 1781), and translated into English ("Crimes and Punishments," Edinburgh, 1798), German, French, and other languages. This essay, which urged the abolition of capital punishment and the torture, established his fame as the originator of a more humane system of penal jurisprudence, and wrought important reforms almost everywhere, though in his own country he was at first depreciated. Voltaire wrote a commentary on it under the title of *Un avocat de Besançon*, and subsequently Beccaria visited him and D'Alembert. The correspondence of Baron Grimm attests the great popularity of Beccaria's views in France. Kant commended them, but the most learned disquisition on the subject is by Cesare Cantù (Florence, 1862). Catharine II. adopted Beccaria's suggestions in the Russian code, and offered him an office, which he declined in order to accept the professorship of political and administrative sciences especially created for him at Milan in November, 1768. His opening discourse, "On Commerce and Public Administration," was translated into French by Antoine Comparet (1769). In 1771 he became a member of the supreme economic council, and on the abrogation of this body he was transferred to the magistracy, and placed in 1791 on the committee for the reform of the civil and criminal code. He promoted reforms in trade, currency, and statistics, and urged the adoption of uniformity in weights and measures. His lectures on political economy have been published under the title of *Elementi di economia pubblica*, in the collection of the *Scrittori classici italiani di economia politica*. The best complete edition of his works, including his *Ricerche intorno alla natura dello stile*, is by Villari (Florence, 1854).

BECCARIA, Giambattista, or **Giovanni Battista,** an Italian electrician, born at Mondovi, Oct. 3, 1716, died in Turin, May 27, 1781. He entered the religious order of the Piarists in 1732, and always remained a member of it. He became professor of experimental physics at Palermo and afterward at Rome, and in 1748 at Turin. Subsequently he was tutor of the princes de Chablais and de Carignan, and spent the rest of his life in Turin. His fame rests upon his treatise *Dell' elettricismo naturale e artificiele* (Turin 1753), which was translated into English by Franklin (London, 1771). His most remarkable experiments and theories relate to the limited conducting power of water, to the electrification of the air and smoke, to the velocity of electricity, to its influence in reducing metals, and to various phenomena connected with storms and atmospherical magnetism. The "Philosophical Transactions" of the royal society of London, of which he was made a fellow in 1755, contain his letter to Franklin (1760) entitled "Experiments in Electricity," and other papers in Latin. At the suggestion of Boscovich, he was commissioned in 1759 to measure the length of a degree of the meridian in the immediate vicinity of Turin. This work, which was not regarded as very accurate, he completed in 1768, and published an account of it in 1774 (*Gradus Taurinensis*).

BECERRA, Gaspar, a Spanish sculptor and fresco painter, born at Baeza in 1520, died in 1570. He studied under Michel Angelo at

Rome, and on his return to Madrid executed several works in fresco for the palace, and adorned many churches. His masterwork is a statue of the Virgin.

BECHER, Johann Joachim, a German chemist, born in Spire in 1625, died in London in October, 1682. In spite of adverse circumstances, he acquired a knowledge of medicine, physics, and chemistry, became professor at Mentz, and in 1660 imperial councillor at Vienna and first physician to the elector of Bavaria. He endeavored to promote industry and a spirit of enterprise in Vienna, but incurred the displeasure of the court, and after many unfortunate experiences in various places he ended his life in London. His fame rests on his *Physica Subterranea* (Frankfort-on-the-Main, 1669), establishing a close relation between chemistry and medical science, and on his founding the theoretical basis of chemistry.

BECHSTEIN, Johann Matthäus, a German ornithologist and forester, born in Waltershausen, Saxe-Gotha, July 11, 1757, died in 1822. Having visited the most celebrated hunting grounds of Germany, he opened at Kemnate a school of forestry, and became in 1800 the director of the Saxe-Meiningen academy of forestry. His principal works are *Gemeinnützige Naturgeschichte Deutschlands* (4 vols., Leipsic, 1789–'95; 2d ed., 1801–'9), and *Naturgeschichte der Stubenvögel* (4th ed., Halle, 1840).

BECHUANA (singular, *Mochuana*, from *chuana*, free, and a personal prefix), a people of S. Africa, inhabiting an extensive territory on both sides of the tropic of Capricorn, divided into numerous tribes. Their complexion is a coffee-colored brown, that of the Barolong tribe being the lightest. They are of medium size, symmetrically built, and have the crisped woolly hair of the negro. They are of a gentle disposition. Slavery hardly exists among them. They are rich in sheep and goats, but less so in horned cattle. They have some notion of deity, but have no religious rites, though monkeys, snakes, and crocodiles are sometimes worshipped. They affirm that they originally sprang from a cave, which is still pointed out in the Bakoni country, and where the footmarks of the first man may be still seen in the rocks. Their faith in the supernatural power of a class of wizards termed rain-makers, one of whom at least is found in every tribe, they share with the other peoples of southern Africa. Polygamy exists to an unlimited extent, and circumcision is a general practice. Missionaries have obtained access to several of the most western tribes, and by their influence the women, who formerly performed all the agricultural work, have been relieved from the heavier tasks. The government of the Bechuana is both monarchical and patriarchal, and of a mild character. Every tribe has its chief or king, who resides in the largest town, and is held sacred by reason of his hereditary authority. Under these chiefs are the heads of particular districts and villages, and again under these are the *cosi*, or wealthy men, who form the aristocracy. The power of the princes is very great, but is limited by the general assembly, called the *picho*, of the subordinate chiefs.—The Bechuana formerly extended S. as far as the Orange river, but were driven back by the Hottentots. At a recent period the Caffres made an incursion from the east deep into the Bechuana territory, and devastated the country, destroying cities, many of which had a population of 20,000. More recently the Boers have founded establishments, including the Orange River Republic, within the Bechuana territory. Among the most important and best known of the Bechuana tribes are the Bassuto, which is the most southerly of them, occupying a table land to the west of the Drakenberg mountains, partially civilized and Christianized; the Batlapi, among whom missionaries have had the greatest success, dwelling in a parched region, almost destitute both of wood and water, on the borders of the Kalahari desert; the Barolong, dwelling to the north of the preceding, formerly powerful, but now scattered and almost extirpated by the Caffres; the Bangwaketse, dwelling still further to the north, in a fine and fertile valley, who were formerly wealthy, but have suffered severely from the incursions of the Caffres; the Bahurutse, dwelling in the vicinity of the foregoing, in one of the finest districts of S. Africa, who had considerable industry in agriculture and raising cattle, till they were driven by the Caffres from their country, which in 1837 was seized by the Boers; the Batoana, dwelling on the N. coast of Lake Ngami, the remnant of the former powerful tribe of Bamangwato; the Bakwains, who occupy the fine hilly regions along the rivers Notuani and Mariqua; and the Balaka, who are not of Bechuana stock, but, like the Bushmen, live scattered among various tribes, and are generally despised. Under the name of Bakalahari, the Balaka dwell in great numbers in the Kalahari desert. The Bayeye, who dwell upon the borders of Lake Ngami, are also to be distinguished from the Bechuana.—The fullest information concerning the tribes of southern Africa is contained in the "Travels and Researches" of Livingstone.

BECK, or **Beck, David,** a Dutch portrait painter, one of the ablest pupils of Vandyke, born in 1621, died at the Hague in 1656. He painted with so much rapidity, that Charles I. of England exclaimed, "Faith, Beck, I believe you could paint riding post." Queen Christina of Sweden employed him in painting the portraits of European sovereigns, and chiefly her own portrait. He travelled extensively, and while sick in Germany he was thought dead and prepared for the grave, but revived and was gradually restored to life. His subsequent death was ascribed to poison.

BECK, Karl, a German poet, born at Baja, Hungary, May 1, 1817. He is the son of a Jewish merchant, studied in Pesth, Vienna, and Leipsic, and has since 1848 chiefly resided in Vienna.

His first poems appeared in 1838 and 1839, and his reputation was established by his novel in verse, *Janko, der ungarische Rosshirt* (Leipsic, 1842). Among his principal succeeding works are: *Lieder vom armen Mann* (Berlin, 1846); *Aus der Heimath* (Dresden, 1852); *Mater Dolorosa* (Berlin, 1853); *Jadwiga* (Leipsic, 1863); and *Elegieen* (Vienna, 1869). He wrote a drama entitled *Saul* (Leipsic, 1841), not adapted for the stage. Many of his works, especially *Janko*, are remarkable for their delineation of Hungarian characteristics. A collection of his poems (*Gesammelte Gedichte*, Berlin, 1844) has passed through many editions.

BECK. I. Theodoric Romeyn, an American physician, born in Schenectady, N. Y., Aug. 11, 1791, died in Utica, N. Y., Nov. 19, 1855. He was a graduate of Union college (1807), began his medical career in Albany, prepared in 1813 a systematic report on American minerals, became in 1815 professor of the institutes of medicine and lecturer on medical jurisprudence in the college of physicians and surgeons of western New York, and was principal of the Albany academy from 1817 to 1848. In addition he was professor in the Fairfield medical college, 1826–'40, and in the Albany medical college, 1840–'54. He was president of the New York State medical society in 1829, founder and for some time president of the Albany institute, and one of the managers of the New York state lunatic asylum from the time of its foundation, and its president in 1854. His statistical publications relating to the deaf and dumb had a powerful effect in influencing the state legislature to provide for their education. He edited the "American Journal of Insanity" (1849–'53), wrote extensively for scientific periodicals, and published with his brother a celebrated work on the "Elements of Medical Jurisprudence" (1823; 7th ed., with notes by Dr. Dunlap and Dr. Darwell, London, 1842; 10th ed., 2 vols., Albany, 1850). **II. John Brodhead,** an American physician, brother of the preceding, born in Schenectady, Sept. 18, 1794, died in Rhinebeck, N. Y., April 9, 1851. He was a graduate of Columbia college (1813), practised in New York, and was in 1822 one of the founders and for seven years the chief editor of the "New York Medical and Surgical Journal." In 1826 he became professor of materia medica and botany in the college of physicians and surgeons, and afterward exchanged the chair of botany for that of medical jurisprudence, which, together with that of materia medica, he filled till his death. He coöperated with his brother in his "Elements of Medical Jurisprudence," and published "Medical Essays" (1843), "Infant Therapeutics" (1849), and "Historical Sketch of the State of Medicine in the Colonies" (1850). **III. Lewis C.,** an American naturalist, brother of the preceding, born in Schenectady, N. Y., Oct. 4, 1798, died in Albany, April 21, 1853. He was a graduate of Union college (1817), and professor successively of botany in the Rensselaer institute at Troy (1824–'9), of botany and chemistry in the Vermont academy of medicine, of chemistry and natural history in Rutgers college, and of chemistry in the Albany medical college. In 1837 he was appointed mineralogist in the geological survey of New York. He published works on botany, chemistry, adulterations, the "Mineralogy of New York" (4to, 1842), &c.

BECKER, a N. W. county of Minnesota; area, 1,400 sq. m.; pop. in 1870, 308. The Red river of the North has its source in Elbow lake, in the N. E. part of the county. Detroit lake, in the S. W. part, empties into the Red river, and White Earth lake, in the N. part, into Wild Rice river. Buffalo river, also a branch of the Red, drains the W. part, while the S. E. corner is watered by affluents of the Crow Wing river.

BECKER. I. Gottfried Wilhelm, a German physician and writer, born in Leipsic, Feb. 22, 1778, died there, Jan. 17, 1854. He translated some of Cooper's novels, and *Le mie prigioni* of Silvio Pellico. By his literary labors he accumulated $40,000, to which his son Karl Ferdinand added a house of the value of $7,000, appropriating the whole amount to the establishment of an educational and charitable institution for the blind at Leipsic. **II. Karl Ferdinand,** a German musician, son of the preceding, born in Leipsic, July 17, 1804. He studied the piano, harmony, and composition under Friedrich Schneider, and at the age of 14 made his first public appearance as a pianist. Soon after this he turned his attention specially to the organ, and became professor of the organ and of harmony at the Leipsic conservatory. He has published several pieces for the piano, not of great value, and made important collections of chorals; but he is better known as a writer on musical art than as either a composer or compiler. He contributed largely to musical journals, among others to the *Cæcilia*, edited by Gottfried Weber, the *Eufonia*, the *Tageblatt*, and the *Zeitgenossen*. Finally, when Robert Schumann established his *Neue Zeitschrift für Musik*, Becker became one of its most constant contributors. He has published *Rathgeber für Organisten* (Leipsic, 1828); *Systematisch-chronologische Darstellung der musikalischen Literatur* (1836); *Die Hausmusik in Deutschland in dem* 16., 17. *und* 18. *Jahrhundert* (1840); an index of musical works published during the 16th and 17th centuries (*Die Tonwerke des* 16. *und* 17. *Jahrhunderts*, 1847); *Die Tonkünstler des* 19. *Jahrhunderts* (1849), &c.

BECKER, Karl Ferdinand, a German philologist, born at Liser, near Treves, April 14, 1775, died at Offenbach, Sept. 5, 1849. He was educated at Hildesheim, taught there from 1794 to 1799, subsequently studied and practised medicine, and was a surgeon in the army. In 1823 he established a school at Offenbach. In his writings on comparative philology he followed logical and philosophical principles, in opposition to the school of philologists who base their investigations chiefly upon historical and ethnological development. His grammars

and manuals of the German language passed through many editions.

BECKER, Karl Friedrich, a German historian, born in Berlin in 1777, died there, March 15, 1806. He studied in Berlin and Halle, became a teacher, and published *Weltgeschichte für Kinder und Kinderlehrer* (9 vols., Berlin, 1801–'5). Woltmann added to this series a 10th volume, and A. Menzel two more; and Adolf Schmidt's edition of 1860–'67 contains 20 volumes, including Arnd's *Geschichte der letzten vierzig Jahre* and its continuations to 1867. The same author's *Geschichte der Jahre* 1867–1871 (1st vol., 1872) is also to serve as a supplement. Becker's original nine volumes continue to be the most popular part of the work, especially among juvenile readers. Equally attractive for the young are his three volumes of *Erzählungen aus der alten Welt* (Halle, 1801–'3; 4th vol. by Günther, 1842, containing *Die Perserkriege;* 9th and revised ed. by Eckstein, 1857).

BECKER, Rudolf Zacharias, a German author, born at Erfurt, April 9, 1752, died March 28, 1822. He studied theology at Jena, and became a teacher and journalist at Dessau, and eventually at Gotha, where the wide circulation of his writings led him in 1797 to establish a publishing house. Over 500,000 copies of his *Noth- und Hülfsbüchlein, oder lehrreiche Freuden- und Trauergeschichte des Dorfes Mildheim* (Gotha, 1787–'98), were sold within a few years in Germany and in foreign translations. He made a valuable addition to German art by his edition of *Holzschnitte alter deutscher Meister* (1808–'16). In 1814 appeared *Becker's Leiden und Freuden in siebenzehnmonatlicher französischer Gefangenschaft*, a narrative of his imprisonment by the French (1811–'13) on account of his alleged conspiracy against Napoleon.

BECKER. I. Wilhelm Gottlieb, a German archæologist, born at Oberkallenberg, Nov. 4, 1753, died in Dresden, June 3, 1813. He studied at the university of Leipsic, was a teacher in Dessau, and became professor at the Dresden art academy (*Ritterakademie*) in 1782, director of the gallery of antiquities and of the numismatic museum in 1795, and of the green vaults in 1805. He edited the *Encomium Moriæ* of Erasmus (*Lob der Narrheit*, Basel, 1780), and published the works of Holbein (Berlin, 1781). His principal works are: *Augusteum, Dresdens antike Denkmäler enthaltend* (2 vols., Dresden, 1805–'9; new and enlarged ed., 1832–'7, with 162 engravings), and an illustrated work on the coins of the middle ages in the Dresden numismatic museum (Leipsic, 1813). **II. Wilhelm Adolf,** son of the preceding, born in Dresden in 1796, died in Meissen, Sept. 30, 1846. He was professor of classical archæology at the university of Leipsic. His *Gallus* (3d ed., 2 vols., Leipsic, 1863) and *Charicles* (2d ed., 3 vols., 1854) have been translated into English by the Rev. Frederick Metcalfe, with notes (London, 1844 and 1854). In these works the life, manners, and customs of the ancient Greeks and Romans are admirably depicted, accompanied by learned and elaborate excursuses. His principal work is *Handbuch der römischen Alterthümer*, completed after his death by Marquardt (5 vols., 1843–'64).

BECKET, Thomas à, an English prelate and statesman, born in London about 1117, assassinated in Canterbury, Dec. 29, 1170. His father, Gilbert Becket, a native of Rouen, was of Norman and not of Saxon blood, and his mother, generally represented as a Saracen convert to Christianity, was probably actually born at Caen. Thierry and other writers who picture Becket as a champion of the Saxons against the Normans, are not sustained by later critics, who find no mention of him in that character by contemporary authorities; and the contest had moreover then become one of class and not of race. At the time of his birth his father was established in London as a merchant, and Becket grew up with the feelings of an Englishman of the respectable middle class. He was educated at Merton abbey, Surrey, and at Oxford, London, and Paris. While employed in the office of his father, who was sheriff of London and acquainted with Theobald, archbishop of Canterbury, the latter enabled him to study law in Bologna and in Auxerre, and presented him on his return to England, after he had taken deacon's orders, with the livings of St. Mary le Strand and Otterford, Kent. He next employed him in missions to Rome, in one of which he successfully negotiated for the restoration of the legatine power of the see of Canterbury. The archbishop now appointed him archdeacon of Canterbury, provost of Beverley, and prebendary of Lincoln and St. Paul's. In 1158 Henry II. made him lord chancellor of England, in which capacity he had to discharge all the functions which now devolve upon the different members of the cabinet, besides officiating judicially. He was fond of the chase, and as conspicuous on the battlefield as he was at the head of the state. The valor which he displayed as a commander by the side of the king in France led to his being made tutor of his young son Henry, whose marriage with Margaret of France he negotiated. Intimately associated with the king, he yet refrained from joining in his excesses; and though as chancellor and as a soldier he threw off his clerical character and was addicted to stateliness and display, his morals were exemplary and he was by no means irreligious. So powerful became his influence over Henry that in 1162, on the death of Theobald, the king pressed his election to the see of Canterbury; and some authorities ascribe to Henry the intention of making Becket ruler in England as viceroy, while he was himself to rule as king in France. He was the first native Englishman who held the archbishopric of Canterbury, and having been ordained as priest, he was consecrated with great pomp as

primate of all England. He incurred the displeasure of his royal master by relinquishing the chancellor's office, which the king wanted him to retain; and he was deprived of the archdeaconry, which Becket wished to keep along with the archbishopric. Becket now became as austere and sturdy as a prelate as he had been brilliant and courtier-like as a statesman; and he acquired great renown and popularity as a fearless champion of the prerogatives of the church, and incidentally of the people, against the encroachments of the crown and the nobility. It has been alleged that his qualities fitted him better for the court and the camp than for the church; but it was only through the latter that one of his origin could in his day have risen so high. He began to make his influence felt in 1163 at the council of Rheims, where he lodged complaints against English laymen for tampering with ecclesiastical rights and property. He claimed from the crown Rochester castle as belonging to the church, and this and other bold steps broke off his friendly relations with the government and the nobility. His opposition to the famous constitutions presented at Clarendon in 1164 became the signal of bitter feuds between him and the king. The privilege for which he contended related to the delivery of the most helpless masses of the people from the grasp of the royal courts, and to the trial of their cases by the milder ecclesiastical jurisdiction. One of the Clarendon constitutions, forbidding the ordination of villeins without the consent of their masters, was particularly obnoxious to the people, with whom he rose in favor in the same degree that he lost ground with the court. Henry II. withdrew his son from his tutorship, and Becket took a solemn vow to resist the Clarendon constitutions, but at length was compelled to recognize them at the request of the pope, who absolved him from the violation of his pledge. Henry nevertheless continued hostile to him; and to escape from his persecutions, he fled from England, but was driven back by stress of weather. Charging him with a breach of allegiance on account of this attempt to desert his post, the king had him tried by a parliament at Northampton; and Becket, overwhelmed with penalties, despoiled of his property, and deserted by all but the common people, fled in disguise, embarking from Sandwich for Gravelines. Henry confiscated the revenues of his see and made unavailing efforts to have him expelled from Flanders and France. Becket spent nearly two years unmolested in the Cistercian abbey of Pontigny in Burgundy; and although the king sent an embassy to Rome for the vindication of his course, Becket, after resigning his see into the hands of the pope, was immediately reinstated by his holiness, and his cause was also taken up by the king of France. Becket's boldness increasing with his success, the king struck his name from the liturgy, expelled 400 of his relatives from England, and made it a criminal offence to correspond with him or to hold intercourse with him in any way. The pope having confirmed Becket's legatine power or primacy of all England except the see of York, the archbishop attempted to awe the church and state into submission to his and the pope's will, and is said to have been restrained only by the illness of the king from having him excommunicated. The efforts of the pope and the French monarch, and several personal interviews between the king and the archbishop, all proved unavailing to effect a reconciliation; and the strife increased in bitterness when Henry II. had the coronation of his son Henry, a prerogative of the primate, performed by the archbishop of York. The latter and his assistant bishops were consequently suspended by the pope at Becket's request. In 1170, however, a reconciliation took place at Freitville, a border town in Touraine, and the king restored to him his see and all its privileges. On his return to England, the people gave him an enthusiastic reception; but he speedily revived the old feud by publishing the suspension of the archbishop of York. The king, who was in Normandy, taunted his attendants for their remissness in revenging him on the overbearing prelate. This incited Reginald Fitzurse, William de Tracy, Hugh de Moreville, and Richard Brito, four barons of the court, to undertake the task. They met Dec. 28, 1170, at the castle of Ranulph de Broc, near Canterbury, accompanied by a body of armed men. The next day they had a stormy interview with the archbishop in his palace, and on the same evening invaded the cathedral during the vesper service. Becket prevented all opposition to their ingress by declining, as he said, "to convert a church into a castle," and implored his assailants to spare everybody except himself. They attempted to drag him out of the church so as not to desecrate it by bloodshed; but while manfully wrestling with De Tracy, Becket received a blow which inflicted a slight wound upon him, and which shattered the arm of his faithful crossbearer, Edward Grimes. The archbishop then kneeled at the altar, when the other three barons gave him the deathblow and his brains were scattered on the floor. The murderers fled from the wrath of the people to Knaresborough and then to Rome, whence the pope sent them as penitents to the Holy Land. The king of England barely escaped from being excommunicated by the pope, who ordered the cathedral to be closed for one year. In 1172 Alexander III. canonized Becket as Saint Thomas of Canterbury. His remains were deposited in 1221 by Henry III. in a rich shrine, which became a resort of pilgrims (described in Chaucer's "Canterbury Tales"), the scene of alleged miracles, and of periodical festivals. Henry VIII. after the reformation despoiled the shrine of its precious treasures, and had the saint's name struck out of the calendar and his bones burnt and scattered. Not a vestige remains of the

magnificent shrine, and the cathedral itself was partly destroyed by fire in 1872, the interior of the eastern part of it, known as Becket's crown or corona, having been only recently finished.—The most important contemporary Latin biographers of Becket were Edward Grim, Roger of Pontigny, William Fitz-Stephen, Alan of Tewkesbury, Herbert of Bosham, and an anonymous writer whose MS. was found in the library of Lambeth palace and reproduced by Dr. Giles. Garnier de Pont Sainte Maxence, who was acquainted with Becket's sister Mary, abbess of Barking, published a French biography in verse at the close of the 12th century. Lord George Lyttelton (1764–'7) and Joseph Berington (1790), in their historical works on Henry II., were the most important English writers on the subject in the 18th century. Southey's "Book of the Church" (1824; new ed., 1869) contains an attractive biography of Becket. *Les deux chanceliers d'Angleterre*, by Ozanam, appeared in Paris in 1836. The "Remains" of R. H. Froude (4 vols., 1838–'9) was followed by two editions of Dr. Giles from the Latin (8 vols., Oxford, 1845; 5 vols., 1848), and by his better known English "Life and Letters of Thomas à Becket" (2 vols., 1846). Dean Stanley's "Historical Memorials of Canterbury" (1855; 5th ed., 1869) gives a minute narrative of the martyrdom and the posthumous history of Thomas in the chapter on the shrine. Dean Milman's "History of Latin Christianity" contains in the 3d and last volume (London, 1854) a full account of the Becket or Thomasian controversy, and this is regarded as one of the best authorities. The German work, *Der Heilige Thomas und sein Kampf für die Freiheit der Kirche*, by Buss (Mentz, 1856), was followed in London in 1859 by "The Life and Martyrdom of St. Thomas Becket," &c., by John Morris, canon of Northampton, and by "Becket, Archbishop of Canterbury, a Biography," by James Craigie Robertson, canon of Canterbury. Edward A. Freeman's essay on "St. Thomas of Canterbury and his Biographers," in his "Historical Essays" (London, 1871), throws new light on Becket's life, refutes the fallacies of Thierry and of other writers, and reveals the religious bias of the different biographers. A "Life of Thomas à Becket," translated from an Icelandic saga, is in course of publication under the auspices of the master of the rolls (London, 1872).

BECKFORD. I. William, an English politician, born in the West Indies in 1690, died at Fonthill, Wiltshire, June 21, 1770. He became a member of parliament in 1746 for Shaftesbury, and afterward for the city of London, and was the friend and supporter of Wilkes. Successively alderman, sheriff, and twice lord mayor of London, he acquired celebrity in 1770 by volunteering manly remarks to George III. while presenting an address of the city of London remonstrating against parliament, against the king's former unfavorable reply to the popular grievances, and demanding the removal of the cabinet. The speech concluded thus: "Permit me, sire, to observe that whoever has already dared, or shall hereafter endeavor, by false insinuations and suggestions, to alienate your majesty's affections from your loyal subjects in general, and from the city of London in particular, is an enemy to your majesty's person and family, a violator of the public peace, and a betrayer of our happy constitution, as it was established at the glorious revolution." The excitement produced by his boldness preyed upon his mind to such an extent that he died soon afterward. His statue was placed in Guildhall, and his speech to the king engraved on the pedestal. As he was a man of limited culture, it was believed that John Horne Tooke, who claimed the authorship of the speech, had either prepared it before or revised it after its delivery. **II. William,** an English romancer, son of the preceding, born in 1760, died May 2, 1844. He inherited a vast fortune, estimated as yielding over £100,000 annually, and he claimed lineal descent from the royal dynasties of Scotland and from other illustrious ancestors. The great earl of Chatham, his father's friend, was his sponsor and the promoter of his education. The precocity of his mind was revealed in 1780 by the publication of a satirical work against artists ("Biographical Memoirs of Extraordinary Painters"). He was in Paris in 1778, where he became acquainted with Voltaire, and travelled extensively till 1783, when he married Lady Margaret Gordon, a daughter of the earl of Aboyne, who bore him two daughters, the eldest of whom married Col. (afterward Lieut. Gen.) James Orde, and the younger became duchess of Hamilton. He was a member of parliament at different periods, and acquired literary celebrity by his romance of "Vathek, an Arabian Tale," written in French. An English version was published by an anonymous author without his consent in 1786, previous to the issue in 1787 at Lausanne of his original edition in French (*L'Histoire du calife Vathek*), which was so perfect in style and idiom that many regarded it as the work of a Frenchman. North in his "Memoir of Beckford" says that "Vathek" is "the finest of oriental romances, as 'Lalla Rookh' is the finest of oriental poems;" and Lord Byron said that "as an eastern tale even 'Rasselas' must bow before it. His happy valley will not bear a comparison with the hall of Eblis." He displayed his fastidious taste for magnificent buildings in the erection of Fonthill abbey, with a lofty tower, which afterward fell owing to its hasty construction. After having sold Fonthill in 1822, in consequence of the diminished income from his Jamaica estates, he built another remarkable mansion on Lansdown Hill, near Bath; and previously while in Portugal he had a fairy palace constructed at Cintra, which was his residence for several years, and which is commemorated by Lord Byron in the first canto of "Childe Harold." His life was

spent in arduous studies, and his exclusive habits and oriental surroundings added the prestige of mystery to the extraordinary impression produced by his palaces and towers, his gems of art and furniture; and his fanciful, extravagant, morbid, and eccentric disposition tallied well with the characteristics of his celebrated romance. Many works were published on Fonthill, and on its artistic and literary treasures, at one time including Gibbon's library, which he had purchased at Lausanne. Among his works is "Italy, with Sketches of Spain and Portugal," published in 1834, though printed in the early part of his life, from his letters written during a residence in those countries. This work has been characterized as a prose poem, and abounds in picturesque and enthusiastic descriptions of scenery and life. In 1835 appeared his "Recollections of an Excursion to the Monasteries of Alcobaça and Batalha." This was his last publication. His "Memoirs" were published in London, 1859 (2 vols.).

BECKMANN, Johann, a German technologist, born at Hoya, June 4, 1739, died in Hanover, Feb. 4, 1811. He was educated for the church, but abandoned theology in order to devote himself to the natural sciences. For some time he was professor of natural philosophy in the Lutheran academy of St. Petersburg; and after studying mineralogy in Sweden, and forming there the acquaintance of Linnæus, he was appointed in 1766 professor at Göttingen. He acquired a high reputation by his lectures and treatises on rural economy (*Grundsätze der deutschen Landwirthschaft*, 6th ed., 1806), finance, commerce, technology, politics, &c. He wrote *Beiträge zur Geschichte der Erfindung* (5 vols., Leipsic, 1780–1805; English translation, "History of Inventions," &c., 4 vols., London, 1817; revised ed., 2 vols., 1846). His editions of the "Wonderful Histories" of Carystius, of *De Mirabilibus Auscultationibus*, and of the "Treatise on Stones" by Marbodius, are valued.

BECKX, Pierre Jean, general of the society of Jesus, born at Sichem, near Louvain, Belgium, Feb. 8, 1795. He was admitted to the society of Jesus at Hildesheim in 1819, was confessor of Ferdinand of Anhalt-Köthen after the conversion of the duke and duchess to Roman Catholicism in 1825, and became pastor of the newly established church at Köthen. After Duke Ferdinand's death in 1830 he accompanied his widow, the duchess Julia, countess of Brandenburg (natural daughter of Frederick William III. of Prussia), to Vienna. In 1847 he was appointed procurator for the society in Austria, but the revolution of 1848 obliged him to leave that country, and he became rector of the college of Louvain. Subsequently he was the superior of the society for Hungary, and eventually provincial for the whole Austrian empire excepting Galicia. After the death of F. Roothaan, May 8, 1853, he was elected general of the society, July 2. His principal work, *Der Monat Mariä* (Vienna, 1843; 9th ed., 1861) has been translated into Italian, Bohemian, and Polish. In December, 1871, he published an appeal to the representatives of foreign governments on the question of the seizure by the Italian cabinet of the great convent of St. Andrew on the Quirinal.

BECQUEREL. I. Antoine César, a French physicist, born at Châtillon-sur-Loing, March 7, 1788. He was educated at the polytechnic school, served with the army in Spain as an officer of engineers, and retired in 1815 with the rank of major. In 1819 he commenced the publication of his mineralogical and geological researches. In studying the physical properties of amber, he was led to experiment on the discharges of electricity by means of pressure; and that was the starting point of almost all his subsequent investigations. He then observed the evolutions of electricity in every kind of chemical action. These researches led to the refutation of the "theory of contact," by which Volta explained the action of his pile or battery, and to the construction of the first electrical apparatus with a constant current. The discoveries in electricity made by Becquerel have been published in the *Annales de physique et de chimie* and in the *Mémoires de l'académie des sciences.* His investigations enabled him to discover a very simple method of determining the temperature of the interior organs of men and animals. He made numerous physiological applications of this method, and discovered that whenever a muscle is contracted a certain amount of heat is evolved. Becquerel is also one of the creators of electrochemistry. In 1828 he made use of this new science in the production of mineral substances, and in treating by the humid process the ores of silver, lead, and copper. For these researches he was elected member of the royal society of London, and in April, 1829, of the French academy of sciences. In 1837 the royal society awarded him the Copley medal for his numerous discoveries in science. He was appointed professor at the Paris museum of natural history the same year, and was promoted in 1865 to the rank of commander of the legion of honor. Among the list of new substances which Becquerel obtained by the action of electricity may be mentioned aluminum, silicon, glucium, crystals of sulphur and of iodine, and numerous metallic sulphurets, such as dodecahedral pyrites, galena, sulphuret of silver, iodurets and double iodurets, carbonates, malachite, calcareous spar, dolomite, metallic and earthy phosphates and arseniates, crystallized silica, &c. He also discovered a process of electric coloring on gold, silver, and copper, which has been extensively and variously applied in practice. In his electro-chemical investigations, Becquerel's object was to discover the relations existing between the electric forces and the so-called chemical affinities, and to excite the latter into action by means of the former. All kinds of

plating with gold or silver by the humid process, such as electrotyping, are only so many various applications of electro-chemistry. Many of his researches relate to the electric conductibility of metals, galvanometers, the electric properties of tourmaline, atmospheric electricity, the effects produced by vegetation, the electro-magnetic balance, capable of measuring with exactness the intensity of electric currents, and to the use of marine salt in agriculture. Among his principal works are: *Traité expérimental de l'électricité et du magnétisme* (7 vols., Paris, 1834–'40; new ed., 2 vols., 1855); *Traité de physique dans ses rapports avec la chimie* (2 vols., 1842–'4); *Traité de l'électricité et du magnétisme* (2 vols., 1855–'6); and *Résumé de l'histoire de l'électricité et du magnétisme* (1858). **II. Alexandre Edmond,** son of the preceding, born in Paris, March 24, 1820. He was assistant professor of natural sciences at the museum, and afterward professor at the *conservatoire des arts et métiers*. In 1853 he was appointed professor of physical sciences. In 1863 he was elected member of the academy as successor of Despretz. He discovered a chloride of silver which will receive and retain the colored impressions of light, so that the colors of the rainbow may now be fixed in the daguerreotype in all varieties of hue; but they can only be retained in obscurity, as they gradually disappear when long exposed to light. In 1862 he published *Études sur l'exposition de Londres*, the phosphoroscope of his invention having attracted much attention at the London exposition of 1861. He assisted his father in his later works. **III. Louis Alfred,** brother of the preceding, born in Paris in 1814, died in 1862. He was a physician and a professor in the faculty of Paris, and author of many valuable treatises. His *Séméiotique des urines* (1841) won a prize from the academy; and a second edition of *Des applications de l'électricité à la thérapeutique médicale* was published in 1861.

BECSE. I. Old (Hung. *Ó-Becse*), a market borough of S. Hungary, in the county of Bács, on the right bank of the Theiss, 25 m. N. N. E. of Neusatz; pop. in 1870, 14,058. It carries on a considerable trade in corn. **II. New** (*Uj-Becse*), a market borough and steamboat station in the county of Torontál, on the left bank of the Theiss, about 4½ m. E. of the preceding; pop. in 1870, 7,193, and with the immediately adjoining village of Franyova, 14,423. It is one of the greatest corn markets in the Austro-Hungarian monarchy.

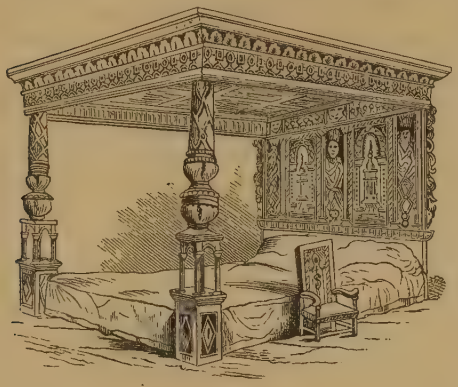
BECSKEREK. I. Great (Hung. *Nagy-Becskerek*), a town of S. Hungary, capital of the county of Torontál, on the Bega, 47 m. S. W. of Temesvár; pop. in 1870, 19,666. It has a Roman Catholic and a Greek church, a gymnasium, and a college of Piarists. The principal trade is in agricultural produce and cattle. **II. Little** (Hung. *Kis-Becskerek*), a village of Hungary, in the county and 10 m. N. W. of Temesvár; pop. about 3,000. It is in a fine agricultural district, famous for its sheep, and has a trade in wool and honey.

BED AND BEDSTEAD. The articles of furniture devised by the people of different nations to secure comfort in reclining for sleep, naturally vary widely with various degrees of civilization, with differences of climates, dwellings, and national characteristics. Savages stretch themselves on the ground or on piles of leaves, or make rough preparations for sleep by spreading skins—probably the first approaches of primitive nations toward a more elaborate bed. The native of the tropics sleeps in a hammock, or on a cool, thin mat of grass. The East Indian at night unrolls his light portable *charpoy*, or mattress, which in the morning is again rolled together and carried away. The Japanese lie upon matting, with a singular and to the European most uncomfortable wooden neck rest in the place of a pillow. The Chinese use low bedsteads, often elaborately carved, and supporting only mats or quilted coverlets. They, too, use for a pillow a peculiar kind of wooden frame, generally of bamboo. In the north of China the bedding is laid in winter upon raised platforms of masonry, which are gently warmed by a small furnace underneath.—The nations of continental Europe generally use the French bedstead, without a canopy above it, and with mattresses of various materials, sheets, coverlets, feather pillows, &c. A peculiarity of the German beds is their shortness; besides this, the bed clothing always consist in part of a large down pillow or upper mattress, which, spread over the person, is supposed to answer the purpose of all other ordinary bedclothing combined. Often this is the only covering furnished; in the houses of the poorer classes and in small country inns this is almost always the case; but all the ordinary hotels of the towns have learned to add to it, in beds intended for foreigners at least, sheets, blankets, and other coverings.—In England, the old "four-poster" bed-

Early English Bed.

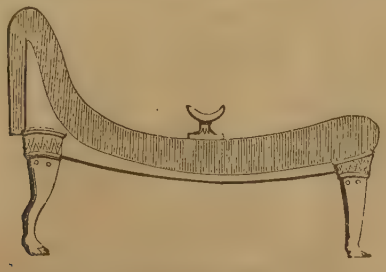
stead, an immense piece of furniture, having a canopy supported over it by posts at the corners, still forms the pride of many country

guest chambers, and is everywhere common, though the simpler open bed is fast taking its place. In the time of Elizabeth the canopy covered only the head of the bed. The Eng-



Great Bed of Ware.

lish beds even now are the largest in the world, and the famous ancient "bed of Ware," alluded to by Shakespeare, is 12 feet square. This bedstead was probably constructed about the year 1500, and has been for three centuries or more preserved in an inn at Ware in Hertfordshire. It is of solid oak, elaborately carved. As many as 12 persons are said to have slept in it at one time.—The beds of the ancients had, in general, few peculiarities to distinguish them from our own simpler forms. Both the Greeks and Romans had their beds supported on frames much resembling our bedsteads; feather and wool mattresses were common, and their bedclothing was, in the luxurious periods of both nations, of great magnificence, and decorated with elaborate needle-work. The ancient Briton slept on skins; after the Roman conquest straw sacks became common as beds. The Egyptians had a couch of peculiar shape, if we



Ancient Egyptian Bed.

may judge from their inscriptions; but the beds ordinarily mentioned in the Bible seem to have been of the customary simple kind.—In recent years many arrangements of the bed have been invented by leading surgeons for the comfort of the wounded and sick; some of a kind permitting the raising or depression of one portion of the body; others so contrived that the patient may lie at such an angle as to permit the performance of very difficult surgical operations. The most useful of all these inventions has been that of the hydrostatic or water bed of Dr. Neil Arnott. This consists of a trough or tub partially filled with water, and covered with a rubber cloth of sufficient size to sink deeply into the tub when empty. This of course floats on the water, and a bed laid upon the cloth accommodates itself to every motion of the person lying upon it. Other valuable beds for surgical purposes are those in which the patient can be moved by turning handles which lower or raise portions of the surface.

BED OF JUSTICE, a name originally given to the raised seat occupied by the earlier kings of France in their councils with the peers and barons for the decision of questions of import. As the parliaments gained increased power, the king appeared personally only in the gravest cases; and the name *lit de justice* was soon applied, not to the seat, but to an occasion when the king was thus present. Still later, a bed of justice was called by the king when the parliament refused to pass a measure of which he approved. He then appeared and solemnly commanded its passage; so that the title became only another name for an act of arbitrary power on the part of the sovereign. The last bed of justice was that held by Louis XVI. in 1787, at which time the whole parliament, refusing to register the royal edict for assembling the states general, were arrested and confined in prisons in different parts of France. This incident forms one of the most striking episodes in the early part of the French revolution.

BÉDARIEUX, a town of Languedoc, France, in the department of Hérault, on the Orbe, 19 m. N. of Béziers; pop. in 1866, 8,985. The town has a college and manufactories of cloths and woollen goods. In 1851 Bédarieux was the scene of a serious insurrection.

BEDBUG. See EPIZOA.

BEDDOES. I. Thomas, an English physician and author, born at Shiffnal, Shropshire, April 13, 1760, died at Clifton in December, 1808. He was educated at Oxford, studied anatomy in London, became a pupil of Sheldon, and published a translation of Spallanzani's "Dissertations on Natural History." He removed in 1784 to Edinburgh, where he published in 1785 a translation of Bergman's "Essays on Elective Attractions," to which he added many valuable notes. He was an active member of the scientific societies of Edinburgh. In 1786 he visited France, formed an intimacy with Lavoisier and other chemists, and on his return to England was elected to the chemical lectureship at Oxford. His talents and position drew around him many men of learning, including Gilbert and Erasmus Darwin; and in 1790 he published a dissertation, in which he claimed for the speculative physician Mayow the discovery of the principal facts in pneumatic chemistry.

His sympathy with the French revolution damaging his position at Oxford, he resigned in 1792, after which he published his work "On the Nature of Demonstrative Evidence, with an Explanation of certain Difficulties concurring in the Elements of Geometry," in which he claimed, in opposition to ontological theories, that mathematical reasoning depends essentially upon experiment, and proceeds only by evidence of the senses. He anticipated new improvements in medicine from the science of galvanism, which was now arising in Italy; and in his first medical work, embracing observations on calculus, sea scurvy, consumption, catarrh, and fever, and conjectures on other objects of physiology and pathology, he showed his tendency to found medical science upon chemistry. The most popular of all his works, and that which best reveals his imagination and taste, as well as judgment, was his "History of Isaac Jenkins," written in favor of temperance, for the benefit of the working classes, of which more than 40,000 copies were rapidly sold. He was enabled in 1798 to establish a pneumatic institution at Bristol, with the assistance of his father-in-law, Richard Lovell Edgeworth, and of Thomas Wedgwood. The superintendent of this institution was Humphry Davy, then a young man, whose first discoveries were made here. The numerous publications of Dr. Beddoes at this time had reference to his favorite theory of the efficacy of the permanently elastic fluids, and of the possibility of curing all diseases by breathing a medicated atmosphere. He was especially sanguine in his expectations from the brilliant discovery by Davy of the respirability and intoxicating qualities of nitrous oxide; and he issued treatises in rapid succession till near the time of his death. Dr. Stock published his memoirs in 1811, and Sir Humphry Davy gave him credit for talents "which would have exalted him to the pinnacle of philosophical eminence, if they had been applied with discretion."

II. Thomas Lovell, an English poet, son of the preceding and nephew of Maria Edgeworth, born in Clifton, July 20, 1803, died in Basel, Jan. 26, 1849. He was brought up under the care of Mr. Davies Giddy (afterward Sir Davies Gilbert), and educated at Pembroke college, Oxford. "The Bride's Tragedy" (London, 1822), though ill adapted for the stage, was highly praised, and Mr. Beddoes was regarded as a reviver of English tragedy. Discouraged by the unwillingness of managers to produce his plays, he went to Göttingen in 1824 to study medicine, and thenceforward chiefly resided in Germany and Switzerland. Two posthumous volumes (London, 1851) contain his tragedies "Death's Jest Book" and the "Second Brother."

BEDE, or **Beda,** called the Venerable Bede, a Saxon ecclesiastic, and the earliest historian of England, born probably at Monkton in Durham in 672, died at Girvy, May 26, 735. He was sent in his childhood to the monastery of Saint Peter at Wearmouth, and was educated there under the abbots Benedict Biscop and Ceolfrid. He was made a deacon at the age of 19, and ordained a priest at 30. His learning and ability were remarkable, and he acquired a wide reputation as a scholar and writer. William of Malmesbury even says, though the truth of the statement is doubtful, that Pope Sergius sent to Bede's superiors, begging them to request him to go to Rome to enter the immediate service of the pontiff. He did not leave his monastery, however, but spent his whole life at Wearmouth, absorbed in study and in writing. His greatest work, the "Ecclesiastical History of the English Nation," occupied him for many years, and has remained the best and most trusted authority on the early period of which it treats. It was compiled from chronicles, the traditions handed down in the convents, and miscellaneous evidence of many kinds; but it is remarkably free from the exaggerations and distortions which fill the books of many of the later monkish historians. Bede produced a great number of other and smaller works, principally essays and treatises on ecclesiastical matters. His literary activity was extraordinary, and his devotion to his work most enthusiastic. Even during his last illness he continued to dictate to an amanuensis the conclusion of a translation of the Gospel of St. John (as is supposed) into Anglo-Saxon; immediately after completing the last sentence he requested his assistant to place him on the floor of his cell, said a short prayer, and expired as the last word passed his lips. Bede's *Historia Ecclesiastica* was first printed in Germany about 1475. There is a copy of this edition in the British museum, and one in Paris. The history was translated from the Latin into Anglo-Saxon by King Alfred, and his version may be found in several English editions, as those of Cambridge, 1644 and 1722. An English translation by Thomas Stapleton was published at Antwerp in 1565. The best modern edition of Bede's Latin text is that of the English historical society (1838). A later English version is that of Dr. Giles (London, 1840), who has also published Bede's complete works, as far as extant, in 6 vols. (1843–'4); and a new translation appeared in 1871.

BEDEAU, Marie Alphonse, a French general, born at Vertou, Aug. 10, 1804, died in Nantes, Oct. 30, 1863. He was the son of a naval officer, was educated at Saint Cyr, distinguished himself at the siege of Antwerp (1832) as aide-de-camp of Generals Gérard and Schramm, served in Algeria, and in 1844 became lieutenant general and commander of the province of Constantine. He was provisional governor of Algeria from July to October, 1847. Commanding one of the five columns in Paris charged with the repression of the insurrection of February, 1848, he was accused by Bugeaud of having evinced too little energy, but proved that he had strictly obeyed that marshal's orders. Though appointed by the revolution-

ary government minister of war, he preferred to be military commander of Paris. He was next commander of the first division of the army of the Alps, was elected to the constituent assembly by the department of Loire-Inférieure, and, though originally a legitimist, was more liberal than most conservatives. He was wounded while operating under Cavaignac against the Paris insurgents in June, 1848. In 1849 he was sent to the legislative assembly by the department of the Seine. He was now considered, after Cavaignac and Lamoricière, one of the principal military supports of the republican constitution. The *coup d'état* of Dec. 2, 1851, consigned him to prison at Mazas and Ham, and subsequently to banishment in Belgium till after the amnesty of 1853, when he returned to France.

BEDELL. I. Gregory Townsend, D. D., an American clergyman of the Protestant Episcopal church, born on Staten Island, N. Y., Oct. 28, 1793, died in Baltimore, Aug. 30, 1834, while on his way to Philadelphia, where he was buried Sept. 2. He was a nephew of Bishop Moore of Virginia, and a graduate of Columbia college (1811). Having been ordained deacon in 1814, he became rector at Hudson, N. Y., in 1815, at Fayetteville, N. C., in 1818, and of St. Andrew's church, Philadelphia, which had been built for his use, in 1823, where he remained till his death. He was the author of many sacred poems, and of several musical compositions, some of which are in familiar use in the churches. Among his other works are: "Bible Studies" (2 vols., 1829), "Ezekiel's Vision," "Onward, or Christian Progression," "Waymarks," "Is it well?" &c. After his death the Rev. Dr. Tyng published a memoir of him with 30 of his sermons (2 vols., 1836); the former was also published separately. As stated in this memoir, "he was very remarkable for the beauty of his oratory, and has been regarded by those best qualified to judge as a model of chaste, dignified, and impressive elocution." **II. Gregory Thurston,** D. D., an American bishop of the Protestant Episcopal church, son of the preceding, born at Hudson, N. Y., Aug. 27, 1817. He was educated at Bristol college, Pennsylvania, and the theological seminary of Virginia, was ordained in 1840 at St. Andrew's church, Philadelphia, and became pastor at Westchester, Penn. He was rector of the church of the Ascension, New York, from 1843 to 1859, since which time he has been assistant bishop of Ohio. He is prominent among the evangelical clergy of the Episcopal church, and a number of his sermons have been published by request in the United States and England. He has also republished one of his father's works, "Pay thy Vows," under the title "Renunciation," with additions of his own.

BEDELL, William, an English prelate, born at Black Notley, Essex, in 1570, died at Kilmore, Feb. 7, 1642. He was secretary to Sir Henry Wotton on his embassy to Venice in 1604. Having acquired the Italian language, he translated the "Book of Common Prayer," and presented it to the clergy who were at the time appointed by the republic of Venice to preach against the papal power. On his return to England he remained in retirement for some time, but was at length presented to a living in Norfolk. In 1627 he was elected provost of Trinity college, Dublin, which office he declined until the king's orders made his acceptance imperative. He was next made bishop of Kilmore and of Ardagh, but resigned the latter see, and addressed himself to the task of reforming the clergy of Kilmore, and of introducing the Protestant worship into Ireland. He studied Irish, and had the Prayer Book with the homilies of Chrysostom and Leo in praise of reading the Scriptures translated and circulated. On the outbreak of the great Irish rebellion he was at first not molested, a respite which he used for the benefit of the distressed Protestants. Soon, however, his palace was invaded, and himself, his two sons, and son-in-law were carried off to a stronghold of the rebels, where all except the bishop were put in fetters. The exposure during the winter brought on a severe fever, of which soon after his release he died. At his burial a concourse of Roman Catholics attended, and a volley was fired over his grave by the rebels. His translation of the Old Testament was published in 1685 at the expense of the Hon. Robert Boyle. His life was written by Bishop Burnet (1685).

BEDFORD, the name of counties in three of the United States. **I.** A S. county of Pennsylvania, on the Maryland border; area, about 1,000 sq. m.; pop. in 1870, 29,635. The surface is broken by numerous ridges of the Alleghanies, whose principal chain forms the W. border of the county. One half of the surface is unfit for cultivation, but in this portion iron ore is abundant. The Pittsburgh and Connellsville railroad passes through the S. W. corner, and the Huntingdon and Broad Top road has its terminus near the centre of the county. The chief productions in 1870 were 338,074 bushels of wheat, 118,091 of rye, 405,261 of Indian corn, 376,296 of oats, 35,491 of buckwheat, 104,657 of potatoes, 28,623 tons of hay, 457,241 lbs. of butter, and 60,705 of wool. There were 8,249 horses, 8,079 milch cows, 10,189 other cattle, 21,746 sheep, and 15,302 swine. Capital, Bedford. **II.** A S. W. county of Virginia, at the E. base of the Blue Ridge, bounded N. E. by the James and S. W. by the Staunton river; area, 504 sq. m.; pop. in 1870, 25,327, of whom 10,770 were colored. The surface is hilly and mountainous and the soil fertile. The Atlantic, Mississippi, and Ohio railroad passes through the county. The chief productions in 1870 were 165,560 bushels of wheat, 258,995 of Indian corn, 249,799 of oats, and 1,956,157 lbs. of tobacco. There were 3,194 horses, 3,995 milch cows, 5,659 other cattle, 5,935 sheep, and 12,649 swine. Capital, Liberty. **III.** A central county of Tennessee, intersected

by Duck river; area, 550 sq. m.; pop. in 1870, 24,333, of whom 6,484 were colored. The surface is undulating and the soil fertile. The county is traversed by the Nashville and Chattanooga railroad. The chief productions in 1870 were 212,922 bushels of wheat, 1,010,642 of Indian corn, 104,801 of oats, 35,516 lbs. of wool, and 869 bales of cotton. There were 6,255 horses, 2,372 mules and asses, 4,568 milch cows, 8,916 other cattle, 25,204 sheep, and 38,962 swine. Capital, Shelbyville.

BEDFORD, a post borough, capital of Bedford county, Penn., 200 m. by rail W. of Philadelphia, on the Raystown branch of the Juniata river; pop. in 1870, 1,247. It is celebrated for its mineral springs, situated in a valley about 1½ m. from the town, and much resorted to by invalids in summer. The water contains carbonic acid, sulphate of magnesia, sulphate of lime, and muriate of soda. It has two weekly newspapers.

BEDFORD, a municipal and parliamentary borough of England, capital of Bedfordshire, situated on the Ouse, 41 m. N.W. of London by a new branch of the Midland railway; pop. in 1871, 16,849. The town is well paved, and divided by the Ouse into two parts, which are connected by a fine stone bridge. John Bunyan preached here and composed his "Pilgrim's Progress" in the county jail. The charitable and educational institutions of Bedford are larger and better than those of most English towns. Many of them were endowed by Sir William Harpur in the reign of Edward VI.; his bequests produce over £13,000 a year, and support several schools of different grades, including a grammar school (which has been enlarged since 1861, and is now known as the Tudor collegiate building), and over 50 houses for paupers. The old church of St. Peter's, with a curious Norman door and an antique font, was enlarged in 1846. The Bunyan meeting house, originally a Baptist chapel, has been rebuilt, and was opened in 1850. Among the prominent public edifices, the Bedford school buildings are remarkable for their beauty and extent; the public library is also a fine establishment. There is an excellent corn exchange, and a new cattle market was opened in 1867. There is an active trade in wheat, barley, malt, coal, timber, and iron. The principal manufactures are pillow lace, straw plait, shoes, and agricultural implements, the iron ploughs of the Howard establishment being the most renowned of England. Bedford has sent two members to parliament ever since the end of the 13th century, besides the two returned by the county. It is supposed to be identical with the town of Bedcanford mentioned in the Saxon Chronicle, the scene of conflicts between the Saxons and Britons late in the 6th century, and 400 years later between the Saxons and the Danes, who burned it early in the 11th century. The first charter on record was granted to the town by Henry II., and the last by Charles II.

BEDFORD, Gunning S., an American physician, born in Baltimore in 1806, died in New York, Sept. 5, 1870. He graduated at the Rutgers medical college in 1829, and afterward spent two years in professional study in Europe. In 1833 he was appointed professor in the medical college of Charleston, and subsequently in the medical college of Albany, N. Y. Soon afterward he commenced practice in the city of New York, and on the establishment of the medical department of the New York university (1840) he was created professor of obstetrics, in which chair he continued till 1862. His two principal works, which have been remarkably popular, are "The Principles and Practice of Obstetrics," and "The Diseases of Women and Children," the latter of which has passed through ten editions. They have been translated into French and German.

BEDFORD, John, Duke of, an English soldier and statesman, born about 1389, died in Rouen, France, Sept. 14, 1435. He was the third son of Henry IV. of England and of Mary de Bohun, daughter of the earl of Hereford. He was knighted in 1399, at the coronation of his father, and became governor of Berwick-upon-Tweed and warden of the Scottish marches. His brother Henry V. in 1415 conferred upon him the dukedom of Bedford, and appointed him governor and commander-in-chief of England, while he vindicated in France his right to that realm. Henry V. in 1422 designated on his deathbed the duke of Bedford as regent of France during the minority of Henry VI., then one year old, and the fourth son of Henry IV., the duke of Gloucester, as regent of England. So great was Bedford's renown, that parliament set aside the king's will so far as to make him also protector of England, excepting during his absence beyond seas, when his brother the duke of Gloucester was to discharge this function. The proceedings on this occasion established an important constitutional precedent in favor of the prerogatives of parliament over the crown. Bedford first offered the regency of France to the duke of Burgundy, on whose refusal he assumed the office in virtue of the treaty of Troyes in 1420, the dukes of Burgundy and Brittany having renewed their adherence to this treaty, and the union between them being cemented by Bedford and the duke of Brittany both marrying daughters of the duke of Burgundy. After the death of Charles VI. of France (Oct. 21, 1422) Bedford proclaimed Henry VI. as king of both countries; but war soon broke out with Charles VII., who was defeated at Crévant (1423), and overwhelmed at Verneuil (1424), where Bedford commanded in person and displayed great skill, but was unable to follow up his victory. Jacqueline of Luxemburg, wife of the duke of Gloucester, had eloped from her first husband, the duke of Brabant, who contested her Hainaut possessions with Gloucester; and when they were invaded by the latter, the duke of Burgundy came to the assistance of his kinsman of Bra-

bant. In addition to the defection of the Burgundian forces, Bedford was crippled by the vexatious course of his brother and of parliament, and by intestine agitation in England. Nevertheless, his victories would probably have culminated in the conquest of France if it had not been for the raising of the siege of Orleans by the interposition of Joan of Arc. Bedford, with reënforcements from the garrison towns of Normandy, followed Charles VII. to Paris. Before the walls of the capital he succeeded in repulsing the maid of Orleans, and in capturing her while she was attempting to make a sally from Compiègne (May 24, 1430); and he was subsequently the principal agent in bringing her to the stake. After the death of his wife, Nov. 14, 1432, he widened still more the breach between him and the duke of Burgundy by marrying Jacquette, daughter of the earl of St. Pol, one of Burgundy's vassals. Cardinal Beaufort exerted himself in vain to reconcile the two princes. At length a treaty of peace was agreed upon, but this was regarded as hostile to English interests, and Bedford's death was hastened by mortification a fortnight before its official ratification. He was a patron of letters, and acquired for London the royal library of Paris.—The dukedom of Bedford was revived in 1694, and conferred upon William Russell, 5th earl of Bedford, the progenitor of the present ducal family.

BEDFORD LEVEL, a district of England, consisting of an extensive tract of level country bounded N. E. by the German ocean, and on all other sides by highlands which encompass it like a horseshoe. It embraces the isle of Ely, in Cambridge, and portions of Huntingdon, Northampton, Lincoln, Norfolk, and Suffolk; length about 60 m., breadth 40 m.; area probably about 400,000 acres. There is good reason to suppose that at the time of the Roman invasion the surface of the district was much lower than now, and covered by one of those vast forests into which the natives used to retreat, and which it was the general policy of the conquerors to destroy. The subjugated people were employed in felling the trees and erecting great embankments to keep out the sea. At the beginning of the 3d century the emperor Severus built roads through the marshes, one of which, from Peterborough to Denver, was 60 ft. wide and made of gravel 3 ft. deep; it is now covered by from 3 to 5 ft. of soil. For many years the district was fertile and well cultivated; but in 1236, during a violent storm, the sea burst through the embankment at Wisbeach and other places, doing immense damage to life and property, and reducing the surviving inhabitants to great distress. A second accident of the same kind occurred in 1253, and a third a few years later. The evil was sometimes aggravated by improper measures taken for its cure, so that in the course of time the greater part of the district became a vast morass, some portions of which were covered with pools of stagnant, putrid water from 10 to 20 ft. deep. Efforts to drain it were set on foot in the reigns of Henry VII., Elizabeth, and James I., but all failed. In the time of Charles I. the earl of Bedford, after whom the district was named, made a partially successful attempt, which was renewed in 1649 by his son, who brought the work to a close and received 95,000 acres of the reclaimed land as a compensation. A regular system for preserving and improving the drained lands was now inaugurated. A corporation for their management, consisting of a governor, 6 bailiffs, 20 conservators, and a commonalty, was chartered and is still kept up. Of late years important improvements have been made in the old system of drainage, which in some respects proved defective. The reclaimed lands produce fine crops of grain, flax, and cole seed, but the harvests have occasionally suffered by fresh inundations, one of which in 1841 involved a loss of over £150,000.

BEDFORDSHIRE (often abbreviated Beds), a county in the south midland division of England, bounded by the counties of Northampton, Huntingdon, Cambridge, Hertford, and Buckingham; area, about 500 sq. m.; pop. in 1871, 146,256. The chief rivers are the Ouse and its tributary the Ivel. The only range of high lands is the lowest portion of the Chiltern hills, the country being generally level. The woods are of modern growth. The chief wealth of the county is agricultural. Near the valley of the Ouse the soil is well adapted for market gardening. Ferruginous peat is found on the shores of the river Ivel. The ancient Ikeneld and Watling Street roads passed through the county, and there are many Roman, Saxon, and Norman antiquities. The Roman forces of Julius Cæsar were opposed by the chief of the district, which was called Catyeuchlana, and under Constantine Bedfordshire was included in the Roman province of Flavia Cæsariensis. Under the Saxon heptarchy it was part of Mercia, and under Alfred it received its present name and divisions. Among the renowned country seats are Woburn Abbey, belonging to the Russell family; Luton Hoo, to the Earl of Bute; Ampthill park, to the Holland family; and Cardington house, once the residence of the philanthropist Howard.

BEDLAM, the popular designation of Bethlehem hospital, a lunatic asylum in London, derived from a priory founded in 1246 by Simon Fitz Mary, sheriff of London. After the suppression of the religious houses, Henry VIII. granted it in 1547 to the corporation of London; but it retained the name of Fitz Mary's hospital till 1675, when the building was removed from Bishopsgate without (where now is Bethlem court) to Moorfields, near London wall, in the city of London. The new hospital was laid out by the architect Robert Hooke, and cost nearly £17,000. This second hospital was taken down in 1814, the foundation stone of the third and present establishment in St. George's Fields having been laid

April 18, 1812. The building has been much enlarged, and now covers 14 acres and accommodates about 600 patients. The annual income is nearly £30,000, and the expenditure over £20,000. The wretched management of the first hospital led in 1771 to the prohibition of the brutal exhibition of maniacs, whose treatment furnished materials for Hogarth's picture of a madhouse in his "Rake's Progress." Patients partly cured were permitted to go at large, and were called Bedlam beggars, or Tom-o'-Bedlams. The mismanagement continued, though in a far less degree, till 1815, since which time improvements have been gradually introduced.

BEDOUINS (Arab. *Bedawi*, pl. *Bedwân*, dweller in the desert), the nomadic tribes of Arabia, Irak, and the eastern and southeastern parts of Syria. They live in tribes of from 200 to 20,000 or 30,000 men, moving from place to place as the exigencies of their flocks and herds require. From the earliest ages they have led a pastoral life, dwelling in tents and rearing cattle, with which they supplied the cities, going out on plundering excursions or spending their leisure time in horse-racing, athletic sports, story-telling, and, since the introduction of tobacco, in smoking. All domestic labor except milking and spinning is left to the women and slaves; the arable land is cultivated by the neighboring peasantry, who receive one third of the produce and are maintained at the expense of the proprietor during their stay, as a reward for their service. The women also perform the part of hairdressers to their husbands in curling their locks. The tending of the flocks is left to the boys and girls. The Bedouin considers agriculture beneath his dignity; he despises alike all labor and engagements in commerce, proud of his liberty and genealogy, which he traces back to Mohammed, Ishmael, or Joktan. He is fierce and warlike, not out of patriotism, for he has no country, but for the sake of plunder. The Bedouins are passionately fond of poetry; nearly every tribe has a poet, who recites the deeds of their heroes and adventures of lovers, accompanying his songs with the *rababa*, a kind of one-stringed fiddle. They are among the most expert riders in the world, and are greatly attached to their horses. Their diet is simple, consisting of the flesh and milk of their herds, rice, and coffee. They dislike sleeping in buildings, and when obliged to visit the towns for the sale of their cattle, wool, and grain, their stay there is as brief as possible. The Bedouins are of middle size, spare and sinewy, capable of enduring great fatigue and exposure to the fiery sun and hot winds of the desert. In complexion they are dark brown, have regular features, with deep-set, piercing, and intelligent eyes. Their clothing, especially during predatory excursions, is often reduced to a single cotton shirt bound round the waist with a leathern girdle, into which the Bedouin sticks his arms with a pipe and lighting apparatus. The wealthy Bedouin or the sheikh wears over his shirt a long gown, often of scarlet cloth, with the usual arms, pistols and short dagger, in his girdle, while a silver-mounted sword is swung across his shoulder, and a flowing mantle of cashmere covers the whole. The head dress consists of a *keffiyé* or shawl of wool or silk interwoven with gold lace, with fringes of the same material, folded cornerwise and tied round the head with a cord. He wears clumsy boots of red or yellow leather. The Bedouins practise polygamy and hold slaves. They are ignorant, superstitious, fierce, revengeful, and of depraved morals. Their greatest virtue is hospitality to their guests; but even this is questionable, and the sanctity of the asylum (*dakhil*) has often been violated. Instances, however, are not rare of magnanimous conduct, where the *dakhil* has been faithfully observed even at great danger to the protector. Unlike the Turkomans or other robbers in civilized countries, the Bedouin is averse to shedding blood, and will have recourse to extreme measures only when others have failed. This may be partly attributed to their fear of causing a blood feud. The Bedouins have no criminal code except for murder, when the blood feud is rigidly enforced, and the murderer and sometimes one of his relations is liable to be killed at any moment by the survivors of the victim. But even here a compensation can be made and accepted. (See BLOOD MONEY.) The general government of Arabia is patriarchal, each tribe having its sheikh or chief. The sheikhship is hereditary, the next oldest, whether son or brother, succeeding. The sheikh leads the men to battle, represents the tribe, and acts as arbitrator in differences which may arise between them.—The Bedouins seem never to

Bedouin Arabs.

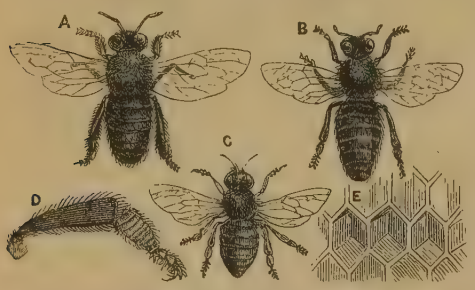
have been conquered. Retiring to their deserts when danger threatens, it is almost impossible for their enemies to follow, where the wells are only known to themselves. But they have not unfrequently suffered terrible retaliation for their robberies. Ibrahim Pasha, the son of Mehemet Ali, in his campaigns against the Wahabees, was perhaps their most successful assailant. The Bedouins have been marauders and scourges over the neighboring territories from the earliest ages; and in the 7th century, when stirred up to the highest degree of excitement by the preaching of Mohammed, they became the terror of both Asia and Europe.

BEE, the name of several genera of honey-making insects, of the order *hymenoptera*, family *anthophila*, divided by Latreille into the two sections *andrenidæ*, solitary bees consisting only of males and females, and *apiariæ*, either solitary or living in large or small societies. Of the different genera of bees no fewer than 250 species are natives of Great Britain. **I. Honey Bee** (*apis*), the best known, most widely diffused, and most useful genus of the *apiariæ*. The common honey bee (*A. mellifica*, Linn.) is probably of Asiatic origin, whence it has spread over Europe, has been introduced in America, and is found in nearly all the warmer portions of the world. There are many other species of *apis*, as *A. ligustica*, of Spain and Italy; *A. unicolor*, of Madagascar; *A. Indica*, of India; *A. fasciata*, of Egypt; and *A. Adansonii*, of Senegal. The generic description of *A. mellifica* will answer in the main for all others domesticated in hives and apiaries. The bee has four membranaceous naked wings, the upper being the larger; the mouth is furnished with two strong mandibles and four palpi, largest in the working bee, and used not so much in eating as in breaking hard substances in their various labors; the teeth, concave scales with sharp edges, are attached to the ends of the jaws and play horizontally. For taking up liquids it has a long flexible proboscis or trunk, performing the office of a tongue, though it is formed by a prolongation of the under lip; it is solid, and not tubular like the trunks of other hymenopterous insects; the trunk is supported on a pedicle, and is protected by a double sheath; the central portion, which appears like a thread or silky hair, under the microscope is seen to terminate in a sort of button fringed with hairs, and the whole organ to its very base is surrounded with similar fringes, admirably adapted for licking up fluids. The eye is large, composed of a great number of six-sided facets thickly studded with hairs; there is one on each side of the head, and between the antennæ there are three small bright spots, considered by Swammerdam and Réaumur as eyes. From the fact of bees recognizing their hives from long distances, and flying in a straight line toward them with the greatest rapidity, it would seem that the sense of vision is very acute; at the same time we see them running their heads against the hive, and actually feeling their way to the door with their antennæ; so that their composite eyes are probably fitted only for distant vision. Whether the

1. Pollen basket of Bee magnified. 2. Trunk of a Bee magnified. 3, 3, 3. Bees constructing cells. 4. Larva of the Bee magnified. 5. Bee seen through a magnifying glass at the moment when the cakes of wax appear between the segments of the abdomen.

spots described by Swammerdam are eyes or not, it seems that the antennæ chiefly guide the bees at night and in the vicinity of near objects. The antennæ are composed of 13 articulations in the males, and of 12 in the females; from their great flexibility and constant motion, most of their impressions from without are doubtless received through these; by them every object is examined and many of the operations of the hive performed, as building the comb, storing the honey, feeding the larvæ, and ascertaining the presence and wants of the queen; their removal completely changes the instincts of both workers and queen. The legs are six in number; in the hind pair of the workers the middle portion is hollowed into a triangular cavity or basket, surrounded by a margin of thickly set hairs; in this receptacle are carried the pollen, propolis, and other hive materials; at the end of the feet are little hooks by which they adhere to the hive, and to each other during the wax-secreting process; the other pairs of feet have a pencil of hairs on the tarsi by means of which the pollen is collected, and brushed off from their bodies on arrival at the hive. The bee has two stomachs: the first is a large membranous bag, pointed in front, for the reception and retention of the honey; no digestion takes place in this, the analogue of the crop of birds; its walls are muscular and capable of throwing back the honey into the mouth for deposition in the cells or distribution to the working bees; digestion is performed in the second stomach, which is of a lengthened cylindrical shape, communicating with the first stomach, and

with the intestine, by a projecting valvular apparatus, with a very small opening, preventing all regurgitation of the food. The muscular strength of bees is very great, and their flight is rapid and capable of being long sustained.—Notwithstanding the cultivation of the hive bee from the earliest antiquity, its history was little more than a series of conjectures until the invention of glass hives in 1712 by Maraldi, a mathematician of Nice, enabled naturalists to study the indoor proceedings of the bee; this invention was taken advantage of by Réaumur, who laid the foundation of the more recent discoveries of Hunter, Schirach, and the Hubers. A hive of bees consists of three kinds, females, males, and workers; the females are called queens, not more than one of which can live in the same hive, the presence of one being necessary for its establishment and maintenance; the males are called drones, and may exist by hundreds and even thousands in a hive; the workers, or neuters, as they have been called from the supposition that they belonged to neither sex, are by far the most numerous. The queen lays the eggs from which



A, Drone. B, Queen Bee. C, Worker. D, Leg of Worker, showing cavity for propolis. E, Cells for honey.

the race is perpetuated; the males do no work, and are of no use except to impregnate the females, after which they soon die or are killed; the workers collect the honey, secrete the wax, build the cells, and feed and protect the young. The females and workers have a sting at the end of the abdomen, which is absent in the males; this formidable weapon consists of an extensile sheath, enclosing two needle-shaped darts of exceeding fineness, placed side by side; toward the end they are armed with minute teeth, like those of a saw, whence it happens that the animal is frequently unable to withdraw the sting from an enemy that it has pierced, causing its own as well as its victim's death; the sting is protruded by several muscles so powerful that it will penetrate $\frac{1}{12}$ of an inch into the thick skin of the human hand. When the sting enters the flesh the acrid poison is squeezed into the wound from a bag near its base; the poison is a transparent fluid with a sweetish and afterward acrid taste, and an acid reaction; it is of so active a character that a single sting almost instantly kills a bee; animals have been killed and men nearly so by the stings of an enraged colony whose hive had been upset. The queens are more peaceable and less disposed to sting than the workers. These three kinds of bees are of a different size and may be easily recognized; the males are of the heaviest flight. The queen bee is the largest, being $8\frac{1}{2}$ lines in length, the males being 7, and the workers 6; her abdomen is longer in proportion, and has two ovaria of considerable size; her wings are so short as hardly to reach beyond the third ring, and her color is of a deeper yellow. She is easily recognized by the slowness of her march, by her size, and by the respect and attentions paid to her; she lives in the interior of the hive, and seldom departs from it unless for the purpose of being impregnated or to lead out a new swarm; if she be removed from the hive, the whole swarm will follow her. The queen governs the whole colony, and is in fact its mother, she being the only breeder out of 20,000 or 30,000 bees. The impregnation of the queen bee was long a subject of uncertainty; it is now known, and has been proved by depriving the queen bee of her wings, that this never takes place within the hive, and that if she be confined she always remains sterile, even though surrounded by males. To accomplish it the queen leaves the hive and flies high into the air; after an absence of about half an hour she returns with unequivocal evidence of sexual union, having robbed the male of the organs concerned in the operation. The male, thus mutilated, soon dies—a fact which has been proved by repeated observation, and from which Huber infers the necessity of a great number of males being attached to a hive in order that the female may be almost certain to meet one in her flight. When impregnation occurs late in the autumn, the laying of the eggs is delayed by the cold weather until the following spring, so that the ova are ready to come forth in March; but the young queen is capable of laying eggs 36 hours after impregnation. Before depositing an egg she examines whether the cell is prepared to receive it and adapted for the future condition of the grub, for queens, males, and workers have cells specially constructed for them; the eggs producing workers are deposited in six-sided horizontal cells; the cells of the drones are somewhat irregular in their form, and those of the queens are large, circular, and hang perpendicularly. When the cells are ready, the queen goes from one to the other, with scarcely any repose, laying about 200 eggs daily; the eggs first laid are those of workers, for 10 or 12 days, during which the larger cells are in process of construction; in these, after they have reached a very large size, she lays male eggs for 16 to 24 days, less numerous than those of the workers in the proportion of about 1 to 30. The royal cells, if from the productiveness of the season and the number in the hive it is determined to bring out another queen, are now commenced; these are of large size, an

inch deep and one third of an inch wide; during their construction the queen lays the eggs of workers, and when they are finished she deposits a single egg in each at one or two days' interval, worker eggs being laid in this interval. When the eggs are laid the workers supply the cells with the pollen of flowers for the food of the larvæ; the pollen is mixed with honey and water, and partly digested in the stomachs of the nursing bees, and distributed of different qualities according to the age of the young. The eggs are of a bluish white color, of a lengthened oval shape, slightly curved; in a proper temperature they are hatched in three days; the larvæ are small white worms without feet. The workers remain five days in this state, the males six and a half, and the females five; at the end of this time the mouth of the cell is closed by a mixture of wax and propolis, and the larvæ begin to spin a silken envelope, or cocoon, which is completed in 36 hours; in three days more the larva changes into a pupa or chrysalis, and on the 20th day it emerges from its prison a perfect worker; the males come forth on the 24th day. The color of the bee just out of its cell is a light gray; it requires two days to acquire strength for flying, during which it is caressed and plentifully fed by the nurses. The same cell may bring several workers to maturity; when the insect comes out the cell is cleaned, the web being left to strengthen the sides. The royal cells are never used but once, being destroyed when the queen escapes. The eggs and larvæ of the royal family do not differ in appearance from those of the workers; but the young are more carefully nursed, and fed to repletion with a more stimulating kind of food, which causes them to grow so rapidly that in five days the larva is prepared to spin its web, and on the 16th day becomes a perfect queen. But, as only one queen can reign in the hive, the young ones are kept close prisoners, and carefully guarded against the attacks of the queen mother, as long as there is any prospect of her leading another swarm from the hive; if a new swarm is not to be sent off, the workers allow the approach of the old queen to the royal cells, and she immediately commences the destruction of the royal brood by stinging them, one after the other, while they remain in the cells. Huber observes that the cocoons of the royal larvæ are open behind, and he believes this to be a provision of nature to enable the queen to destroy the young, which in the ordinary cocoon would be safe against her sting. When the old queen departs with a swarm, a young one is liberated, who immediately seeks the destruction of her sisters, but is prevented by the guards; if she departs with another swarm, a second queen is liberated, and so on, until further swarming is impossible from the diminution of the numbers or the coldness of the weather; then the reigning queen is allowed to kill all her sisters. If two queens should happen to come out at the same time, they instantly commence a mortal combat, and the survivor is recognized as the sovereign; the other bees favor the battle, form a ring, and excite the combatants, exactly as in a human prize fight. The male bees or drones may be known by the thicker body, more flattened shape, round head, more obtuse abdomen containing the male generative organs, the absence of the sting, and the humming noise of their flight; they produce neither wax nor honey, being idle spectators of the labors of the workers, who support them; they comprise about $\frac{1}{10}$ or $\frac{1}{12}$ of the whole number of a hive in the spring when they are most numerous; their use is only to impregnate the females, and, secondarily, to supply food to the swallows and carnivorous insects which prey upon them when they take their midday flights. When the queens are impregnated, and the swarming has ceased, the workers, in July or August, commence an indiscriminate attack upon the drones, chasing them into the bottom and corners of the hive, killing them with their stings, and casting out the dead bodies; this destruction extends even to the eggs and larvæ of males. If a hive is without a queen, the males are allowed to survive the winter. The working bees are the smallest, with a lengthened proboscis, the basket conformation of the posterior pair of legs, and the apparent absence of generative organs. They have been divided by Huber into nurses and wax-workers; the former are the smallest and weakest, ill adapted for carrying burdens, and their business is to collect the honey, feed and take care of the grubs, complete the cells commenced by the others, and to keep the hive clean; the latter take the charge of provisioning the hive, collecting honey, secreting and preparing wax, constructing the cells, defending the hive from attack, attending to the wants of the queen, and carrying on all the hostilities of the community. The number of the workers is from 5,000 or 10,000 to 50,000, according to the size of the hive; they form about $\frac{2}{3}\frac{3}{3}$ of the whole; they are armed with a sting, and are easily excited to use it. They are sometimes called neuters, as if they were of neither sex; but it is now established, by the discovery in them on minute dissection of rudiments of ovaries, that the larvæ of the workers and of the females do not differ; that the queens lay only two kinds of eggs, one destined to produce males, and the other capable of being converted, according to circumstances, into workers or queens; in other words, that the workers are females, in which the generative organs are not developed. On the loss of the queen the hive is thrown into the greatest confusion; the bees rush from the hive, and seek the queen in all directions; after some hours all becomes quiet again, and the labors are resumed. If there be no eggs nor brood in the combs, the bees seem to lose their faculties; they cease to labor and to collect food, and the whole community soon dies. But, if there be

brood in the combs, the labors continue as follows: having selected a grub, not more than three days old, the workers sacrifice three contiguous cells that the cell of the grub may be made into a royal cell; they supply it with the peculiar stimulating jelly reserved for the queens, and at the end of the usual 16 days the larva of a worker is metamorphosed into a queen. This fact, which rests on indisputable authority, is certainly a most remarkable natural provision for the preservation of the lives of the colony. While a hive remains without a queen swarming can never take place, however crowded it may be. The possibility of changing the worker into a queen is taken advantage of in the formation of artificial swarms, by which the amount of honey may be indefinitely increased. In a well-proportioned hive, containing 20,000 bees, there would be 19,499 workers, 500 males, and 1 queen.—The food of bees consists principally of two kinds, the honeyed fluids and the pollen of flowers; they also eat honey dew, treacle, sirup, and any saccharine substance. They lick up honey and fluid substances by their long proboscis from the blossoms of various flowers; the mignonette and clover afford honey of remarkable fragrance and in great abundance. It is inferred that bees have an imperfect sense of taste and smell from their collecting honey indiscriminately from sweet-scented and offensive flowers; it is well known that in some places their honey acquires poisonous qualities from the flowers of different species of laurel, thorn-apple, azalea, and poison ash; many mysterious cases of sickness have been traced to the consumption of such poisoned honey, and even the bees are sometimes destroyed by the vegetable poisons which they imbibe. During the spring, and until late in the autumn, bees collect the pollen from the anthers of flowers by means of the hairs on their legs, and, after forming a ball, transport it in their basket to the hive for the food of the young brood; this pollen consists of small capsules which contain the fecundating principle of flowers, and is so abundant that the bees of a single hive will often bring in a pound daily; hence some agriculturists have supposed that the bees diminish the fecundity of plants by abstracting the pollen, when, on the contrary, they essentially promote it, by transporting the fecundating principle from plant to plant. Honey dew is a saccharine fluid discharged from the tubes at the extremity of the body in the *aphides*, or plant lice; these herd together on plants, and become so gorged with sap that they are obliged to eject the honeyed fluid; this falls on the leaves and dries, forming honey dew, eagerly sought after by bees and ants; the same name has been given to a sweet exudation of the sap from the leaves of plants in dry weather. Bees require considerable water, but they are not particular about its purity. The food of the queen bee has been subjected to chemical analysis by Dr. Wetherill of Philadelphia. That of the royal grubs is a kind of adescent jelly, thick and whitish, becoming more transparent and saccharine as the larva increases in size; it has been shown by Huber to consist of a mixture of honey and pollen, modified by the workers; the former appears amorphous under the microscope, is heavier than water, of the consistency of wax, sticky and elastic; it consists of wax, albumen, and proteine compounds, and is therefore properly called bee bread; it contains albuminous compounds, which would probably prove on analysis similar to the gluten of wheat. Honey alone is not sufficient for the support of bees; they require nitrogenized substances, like pollen, as well as honey and non-nitrogenized food. Wax is secreted in pouches or receptacles, in the abdomen of the working bees only, lined with a membrane arranged in folds like a six-sided network; it accumulates in these until it appears externally in the form of scales between the abdominal rings; these plates are withdrawn by the bee itself, or some of its fellow workers, and used for building and repairing the cells. The formation of wax is the office of the wax-workers, which may be known from the nurses by the greater size and more cylindrical shape of the abdomen, and larger stomach; the secretion goes on best when the bees are at rest, and accordingly the wax-workers suspend themselves in the interior in an extended cluster or hanging curtain, holding on to each other by the legs; they remain motionless in this position about 15 hours, when a single bee detaches itself and commences the construction of a cell, and the others come to its assistance and begin new cells. The quantity of wax secreted depends not at all on the pollen consumed, but on the consumption of honey; when bees are fed on cane sugar they form wax with more difficulty than when they are fed on grape sugar; the former is not so readily decomposed, but may be changed into the latter in the bee's body by the absorption of 2 equivalents of water. According to Liebig, an equivalent of starch is changed into fat by losing 1 equivalent of carbonic acid and 7 equivalents of oxygen; and Dr. Wetherill suggests that wax, which bears a great analogy to fats, may be derived from honey in similar manner. Wax, composed of cerine and myricine, is represented chemically by $C_{34}H_{34}O_2$, and anhydrous grape sugar by $C_{12}H_{12}O_{12}$; so that 3 equivalents of grape sugar would yield 1 equivalent of wax by the loss of 2 equivalents of carbonic acid, 2 of water, and 28 of oxygen.—Bees breathe by means of air tubes, which open externally on the corslet; experiments show that they soon perish in a vacuum or under water, and that a constant renewal of atmospheric air is necessary for their well-being. The condition of a hive, filled with many thousand active and crowded bees, and communicating with the outer air only by a small opening at the bottom, and that usually obstructed by the throng passing in and

out, is very unfavorable for the maintenance of a pure air; the black hole of Calcutta is the only human receptacle which can be compared to it; a taper is very soon extinguished in a globe of the dimensions and with the aperture of a beehive; and yet these insects, as easily suffocated as any other, get along very well, and their respiration is accompanied by the usual absorption of oxygen and excretion of carbonic acid gas. With all this closeness of the air in the hive, direct examination has proved that it is nearly as pure as atmospheric air; neither the contents of the hive nor the bees themselves have any power of evolving oxygen, but the air is renewed through the door of the hive, where an inward current is produced, whenever required, by the rapid agitation of the wings of the bees. Some of the workers are always thus employed in ventilating the hive, which they do by planting themselves near the entrance, and imitating the action of flying; in this way the impulse which would carry them forward in flight is exerted on the air, producing a powerful backward current; this fact explains the humming sound heard in the interior of an active hive, especially in the warmest days. From their active respiration the temperature of a hive is very high, varying from 73° to 84° F., and on some occasions rising to 106°; they are very sensitive to thermometrical changes, the warm sun exciting them to vigorous action, and cold reducing them to a torpid state.—The instincts, and in the belief of many the intelligence of the bee, are remarkably displayed in the preparation of the hive, the construction of the cells, and in the phenomena of swarming. The first thing done on entering a new hive is to clean it thoroughly, to stop all crevices, and lay the foundation for the comb. Wax is not the only material used by bees in their architecture; besides this, they employ a reddish brown, odoriferous, glutinous resin, more tenacious and extensible than wax, called *propolis*, which they obtain from the buds of the poplar and birch and from various resinous trees. This adheres so strongly to the legs of the bee, that its fellow laborers are obliged to remove it, which they do with their jaws, applying it immediately to every crevice and projection in the hive, to the interior of the cells, and to the covering of any foreign body too heavy for them to remove; in this way even large snails are hermetically sealed and prevented from imparting a noxious quality to the air. Bees will carry home many artificially prepared glutinous substances in their tarsal baskets. After the workers have secreted a sufficient amount of wax, the construction of the combs commences. These are formed into parallel and vertical layers, each about an inch thick, the distances between the surfaces of each being about half an inch for the passage of the bees. They may extend the whole breadth and height of the hive, consisting of thin partitions enclosing six-sided cells, about half an inch deep and a quarter of an inch in diameter. The bottom of each cell has the shape of a flattened pyramid with three rhombic sides, like the diamonds on playing cards; this gives the greatest strength and greatest capacity with the least expenditure of material. Maraldi had determined that the two angles of the rhomb should be 109° 28′ and 70° 32′ by mathematical calculation, and by actual measurement they are 110° and 70°. There is nothing in the shape of the antennæ, mandibles, or legs of the bee which should determine these angles in the cells. From the fact that bees stand as close as they can, each depositing its wax around it, some have maintained that the form and size of the insect determine the shape of the cell; that the mathematical accuracy of the cell depends on its form and structure and not on its instinct; and that the cell form is inevitable. The foundation is a solid plate of wax, of a semicircular form, in which a vertical groove is scooped out of the size of a cell, which is strengthened by further additions of wax; on the opposite side two other grooves are formed, one on each side of the plane opposite the first; after the bottom is formed, the walls are raised round the sides. The cells of the first row, by which the comb is attached to the roof of the hive, have five sides instead of six, the roof forming one. The first cell determines the position of all that succeed it; and two are not, in ordinary circumstances, begun in different parts of the hive at the same time. The laborers follow each other in quick succession, each one adding a little to the work; when a few rows have been constructed in the central comb, two other foundation walls are begun, one on each side of it, at the distance of one third of an inch, and parallel to it, and then two others as the former are advanced; the comb is thus enlarged and lengthened, the middle being always the most prominent. If all their foundations were laid at the same time, it would be difficult for them to preserve their parallelism, which is perfect only at the last stage of the building process. Besides the vacancies between the cells, which form the highways of the hive, the combs are pierced with holes, to permit easy communication, and prevent loss of time in going round. The symmetry of the architecture of bees is more observable in their work looked at as a whole than in its details, as they often build irregularly to adapt the structure to different localities and various unfavorable circumstances; different-sized cells are made for the larvæ of workers, males, and queens; those for honey and pollen magazines are twice as large as ordinary cells, and so placed that their mouths are upward, for the easier retention of their contents. These supposed defects are generally the results of calculation, and, when mistakes, are very soon remedied. The cells at first are whitish, soft, and translucent; but they soon become yellow and firmer, and quite dark in an old comb.—

When a hive becomes too crowded, or for other reasons as yet not perfectly understood, preparations are made for the emigration of a swarm with a queen; scouts are sent out in advance to select a proper place for the new hive, and the workers are busy in collecting an extra quantity of provisions to be carried with them. When the weather is warm, and after a full stock of eggs has been laid, the old queen, unsuccessful in her attempts to destroy the royal brood, abdicates the throne which the first-born new queen will soon dispute with her. During the preparations, a great buzzing is occasionally heard, which suddenly ceases on the day of departure. When all is ready, the signal is given by the workers, and the queen, with all the departing swarm, rushes to the door, and rises into the air; they follow the queen, alighting with her in a dense cluster, and returning to the hive if she does. Cold weather, or even a passing cloud, will arrest the emigration until a warmer or brighter period. After a rest at their first landing place, the swarm collects into a close phalanx, and flies in a direct line to the selected spot. The deserted hive is busily occupied in hatching out a new queen, which in her turn leads out a swarm; two or three will be sent off in a summer from an old hive. After the massacre of the males in July or August, the workers busy themselves in collecting stores for winter use; as the autumn advances, honey becomes scarce, and they are obliged to collect the sweet exudations from leaves, honey dew, and also the juices of peaches and other sweet fruits, after the skin has been broken by birds, snails, or insects; when all other resources fail, they do not scruple to attack weaker hives and despoil them of their honey. The cold of winter reduces them to a nearly torpid state, in which they remain until the warm days of spring. The instinct of the bee and its tendency to thrift are curiously manifest in the fact that it accumulates immense stores of honey in tropical and semi-tropical countries, where there is no necessity for laying up supplies for winter, since flowers are abundant at all seasons. In fact, the largest supplies of honey and wax are exported from such countries; the latter is the more important article of commerce, as the honey, particularly from the West Indies and Central and South America, is generally of an inferior quality.—Bees recognize the person of their queen; if a new one be given them, they will generally surround her and suffocate or starve her to death, for it is remarkable that the workers never attack a queen with their stings; if she be permitted to live 24 hours, she will be received as their sovereign. Huber discovered that if the fecundation of the queen be delayed beyond the 21st day of her life, she begins to lay the eggs of males, and produces no others during her life; she lays them indiscriminately in large and small, and even in royal cells; in the latter case, they are treated by the nurses as if they were royal grubs. Reim made the singular discovery of prolific workers, thus explaining the laying of eggs in hives destitute of a queen; but the eggs thus produced are always those of males; this is accounted for by their having passed their grub state in cells contiguous to the royal ones, and from having their generative organs partially developed by devouring portions of the stimulating royal food; how they become impregnated has not been ascertained. (See PARTHENOGENESIS.)—The Italian or Ligurian bee (*A. ligustica*) has been introduced into the United States, and found far superior to the common bee. (See BEE-KEEPING.)—The natural enemies of bees are numerous; among them may be mentioned wasps, hornets, spiders, dragon flies, toads, lizards, woodpeckers, the bee-eater and most insectivorous birds, rats and mice, ant-eaters, bears, and badgers. They seldom die a natural death, and the average duration of life cannot be more than a year; the whole population would be destroyed by their enemies, each other, and the severity of the weather, were it not for the surprising fecundity of the queen, who will lay in temperate climates as many as 60,000 eggs, and in warm regions three times that number; a single impregnation is sufficient to fecundate all the eggs which a queen will lay for at least two years, and probably during her life. The most destructive and insidious enemy of the bee is a lepidopterous insect, of the group *crambidæ*, the *galleria cereana* (Fab.), commonly called the bee or wax moth; in its perfect state it is a winged moth, about three fourths of an inch long, with an expanse of wings of a little more than an inch; the females are the largest, of a dark gray color, tinged with purple-brown and dark spots. (See BEE-KEEPING.)—*Wild Honey Bees.* When bees swarm, if they are neglected and are not speedily hived, they will fly away with their queen to the woods and find a home in a hollow tree, where they lay up honey, rear brood, and send out successive swarms for new wild colonies. Wild bees are abundant in India, the islands of the Malay archipelago, Crete and all the Greek islands, the W. coast of Africa, and throughout America. Those in the United States are all of foreign origin. There were none W. of the Mississippi before 1797, nor in California before 1850; and the Indians call the bee the white man's fly. In regions where wild bees abound, bee hunting is a distinct and important business, pursued by professional hunters or experts. In Africa, India, and the Indian islands, the hunter is unerringly guided to a bee tree by a bird of the cuckoo family. (See HONEY GUIDE.) Wells's "Explorations in Honduras" (New York, 1857) states that in Central America wild swarms generally establish themselves in the hollow limbs of trees; these are removed to the porches of the houses, and are there suspended by thongs; in this primitive way large quantities of honey and wax are obtained. The honey of some of these

swarms is stored in wax bags two or more inches long, ranged along the hive in rows, while the brood cells occupy the centre of the hive. In Timor and other Indian islands there is a wild bee (*A. dorsata*) that builds huge honeycombs, of semicircular form, and often 3 or 4 ft. in diameter, which are suspended in the open air from the under side of the uppermost branches of the highest trees. These the hunter takes by climbing to them, holding a smoking torch under them to stupefy or drive away the bees, and then cutting off the comb close to the limb. In the United States, at the south and west, where bee-hunting is extensively followed, the method is uniform and simple. The hunter takes into the woods a box or basin containing about half a pound of honey, and sometimes various mints or essences are used to attract the bees. If the bees will not come to the honey, one or two are caught and brought to the box, or are caught in boxes devised for the purpose. Several bees collect or are caught in the same localities, and soon fly away loaded with honey. As the bee always rises and circles around till it sees some familiar landmark, and then takes a "bee line" for home, the line of flight is observed by the hunter or his companions. After several bees have flown in the same direction, or in two or more directions, showing that two or more different swarms have been marked, the hunter removes the box to a point at an angle from the first position, more bees are caught and liberated, and their line of flight is marked. The point of intersection of the two lines gives the locality of the sought-for tree. The best time for bee-hunting is in early spring before the leaves are out, for the bees come out freely in fine days, and their line of flight can more easily be seen. When the bee tree is discovered, it may hold a new swarm with no store of honey; but frequently there is a prize of many hundred pounds of wax and honey, which is secured after the tree is cut down by killing or driving away the bees by burning straw. Frequently, if the tree is of suitable size and shape, after it is cut down the orifice where the bees go in and out is stopped, and the section containing the swarm is sawn out and carried home, where the bees may be "drummed" into a hive containing honey and brood comb, in which they will contentedly make a new home and furnish stock for successive swarms. Wild bees abound nearly everywhere in the vicinity of domesticated bees; but they are no longer hunted to any great extent in the thickly settled states, owing to the increased value of timber and contests as to ownership or priority of discovery, out of which many lawsuits have arisen. **II. Humblebee,** a genus distinguished by the loud humming noise they make during flight, whence their generic name *bombus*, the French *bourdon*, and the English bumblebee. It differs from the honey bee in its colors, larger size, and having the tibiæ of the hind legs terminated by spines. More than 40 different kinds are native in Great Britain, and many species abound in America. No insect is more widely diffused; its range extends from the limits of floral vegetation to the equator, and it is everywhere found in great abundance in the temperate zone. The great number of the British species, having the prevailing colors yellow, red, and black, have been divided into three sections: 1, apex of body red; 2, apex of abdomen white; 3, ground color of body yellow or buff. The humblebees live in much smaller societies and are less prolific than the honey bee. They lay in no store of honey, and their main mission seems to be to fecundate plants by carrying pollen from the male to female flowers. In size the workers are the smallest, the males are larger, and the females are somewhat larger than the males. Late in autumn the male and neuter humblebees die; but some of the females survive in a torpid state and without food till spring, when they become the founders of a new colony, and may be seen prying into every hole and crevice in the earth in search of a suitable nest.

Humblebee (Bombus terrestris) and Nest.

This they make at a depth of one or two feet in meadows and plains; they make cavities of considerable extent, dome-shaped, more wide than high; the vault is made of earth and moss, and the interior is lined with an inferior kind of wax; the entrance may be either a simple aperture at the lower part, or a tortuous moss-covered path; the bottom is carpeted with leaves. Their nest has little of the architectural regularity of the hive of the honey bee; there are only a few egg-shaped, dark-colored, irregularly disposed cells, arranged generally in a horizontal position, connected by shapeless waxen columns; these cells are not made by the old bees, but by the grubs, who spin them when they are ready to undergo the change into nymphs; from them they are liberated by the gnawing of the old ones; the cocoons are afterward used as storehouses for honey. The true breeding cells are contained in masses of brown wax, the number of eggs varying from 3 to 30, the whole colony seldom exceeding 60, though the nest of the terrestrial species (*B. terrestris*, Latr.) sometimes contains

as many as 300. The larvæ live in society until they are about to change into nymphs, when each spins a silken cocoon in which the occupant is placed head downward, and from which it comes out in four or five days during May and June. The females assist in building the cells, and deposit at the first laying eggs both of males and females; the males are not reared till late in the season, and like the hive drones do not assist in the care of the young. Several females may live in peace under the same roof; impregnation takes place outside the nest. The honey and wax are of the same origin and nature as those of the honey bee. As they do not hibernate, but perish during the winter, the same nest is not occupied for two successive years. The nest of the species called carder bee (*B. mascorum*, Latr.) is composed of a dome of moss or withered grass placed over a shallow excavation in the ground of about half a foot in diameter; the materials, after being carded by means of the mandibles and fore legs, are pushed by the first bee backward to a second, which passes it to a third, and so on until the nest is reached; they work in long files, the head being turned away from the nest, and toward the material. Their domes are often seen rising 4 or 6 inches above the level of the fields and meadows; the entrance is at the bottom, about a foot long and half an inch wide. The carder bee is smaller than the terrestrial humblebee, and shorter and thicker than the honey bee; it resembles in color the materials of the nest, having the fore part of the back a dull orange, and the hind part with different shades of grayish yellow rings. The lapidary bee (*B. lapidarius*, Latr.) builds its nest in a heap of stones, of bits of moss, neatly arranged in an oval form; they are social in their habits, and collect honey with great industry; the individuals of a nest are more numerous than the carders, and much more vindictive. **III. Solitary Bees** display as much foresight, ingenuity, and skill in the construction of their nests as do the social species, and perhaps in a more remarkable manner, as a single individual begins and finishes every part of the work. There are only two kinds of individuals, males and females; the males are idle, and the females perform all the labor of making the nest and providing food for the young; they have no brush to their hinder feet and no basket structure on the external side of the tarsi.—Different species of *megachile*, *anthophora*, and *osmia* have been called by Réaumur mason bees, from their constructing their nests with sand, earthy substances, and sometimes wood, cemented with a glutinous secretion; they build in the interstices of brick walls, in crevices in stones, and wherever they can find a suitable place, often amid the busiest throngs of men. Within a wall of clay they make from one to six chambers, each containing a mass of pollen with an egg; the cells are sometimes parallel and perpendicular, at others with various inclinations, and are closed with a paste of earth; they are thimble-shaped, and about an inch long. Many species, not larger than a horse fly, have been called mining bees (*andrenæ*), from their digging in the ground tubular

Mason Bee and Nest.

galleries, a little wider than the diameter of their bodies; they are fond of clay banks, in which their holes, of the size of the stem of a tobacco pipe, are frequently seen; they are 6 or 8 inches deep, smooth and circular, with a thimble-shaped horizontal chamber, almost at right angles to the entrance, and nearly twice as wide; in this is placed a single grub with its supply of pollen.—There are several British species of solitary bees to which Réaumur has given the name of carpenter bees, from their working in wood as the mason bees do in earth;

Carpenter Bee and Nest.

they select posts and the woodwork of houses which have become soft from commencing decay. The violet-colored species (*xylocopa violacea*, Linn.) makes her nest by gnawing out

small pieces of the wood, which she carries to a short distance and drops for future use, returning by a circuitous route as if to conceal its location; the direction of the tunnel is oblique for about an inch, and then perpendicular in the axis of the wood for 12 or 15 inches, and half an inch in breadth; sometimes three or four such excavations are made. The tunnel is divided into cells somewhat less than an inch deep, separated from each other by partitions made of the chips and dust cemented together; some other species employ clay for these partitions. At the bottom of the cell is placed an egg, and over it a paste of pollen and honey; in this way are completed 10 or 12 cells, one above the other, and then the principal entrance is closed by a similar sawdust covering. As several weeks are occupied in these labors, and as the bee deposits her eggs at considerable intervals, it is evident that the first egg will have become a perfect insect before the last egg has left the grub state; in order to enable the young to escape as they are hatched, each cell has a lateral opening.—Among the leaf-cutting and upholstering bees may be mentioned the poppy bee (*osmia papaveris*, Latr.), a European species, one third of an inch long, of a black color, with reddish gray hairs on the head and back, and the abdomen gray and silky. She excavates a perpendicular hole in the ground, largest at the bottom, which she lines with the petals of the scarlet poppy cut into oval pieces, and adapted with the greatest nicety and smoothness; the hole is about 3 inches deep, and the lining extends externally on the surface; filling it with pollen and honey to the depth of half an inch, she deposits an egg, folds down the scarlet tapestry, and fills above it with earth; it is rare to find more than one cell in an excavation. The rose-leaf cutter (*megachile centuncularis*, Latr.) makes a cylindrical hole in the hard earth of a beaten path, from 6 to 10 inches

Rose-Leaf Cutter and Nest (Megachile centuncularis).

deep, in which she constructs several cells about an inch deep, thimble-shaped, and made with circular pieces of leaves neatly cut out and folded together; the rose leaf is preferred, but almost any leaf with a serrated margin, as the birch and mountain ash, will be taken; no cement is employed, the elastic property of the leaves keeping them in place; it takes 9 to 12 pieces to make a single cell, which, when completed with its contents of pollen and honey, and single egg, is closed with three pieces of leaf exactly circular; the convex extremity of one cell fits into the open end of the next, by this means greatly increasing the strength of the fabric.

BEE, a S. county of Texas, drained by the Aransas and Mission rivers and their tributaries; area, 900 sq. m.; pop. in 1870, 1,082, of whom 69 were colored. The soil is sandy and poor, and little rain falls in summer. Stock and sheep raising is the principal industry, though some corn is raised. In 1870 there were 260 horses, 78 milch cows, 8,346 other cattle, 1,860 sheep, and 365 swine. Capital, Beeville.

BEECH, a forest tree of the genus *fagus* of Endlicher's order *cupuliferæ*, Lindley's *corylaceæ*, Jussieu's *quercineæ*, and of the Linnæan

Beech Tree (Fagus sylvatica).

class *monœcia polyandria*. The generic characters of the genus are: sterile (male) flowers—ament globular, pendulous on silky thread; perianth 6-cleft, bell-shaped; 5 to 12 stamens. Fertile (female) flowers—2 within a 4-lobed prickly involucre; perianth 4 to 5-lobed; ovary 3-celled (2 abortive); styles 3; nut one-seeded, triangular, enclosed in a cupule which completely covers it. Some branches bear male, others female flowers. The number of species is very limited, some being considered as mere varieties. In the temperate regions of the northern hemisphere, on both continents, there are extensive forests consisting of beeches, which also occur mixed with oaks, pines, firs, &c. *F. sylvatica*, the common European white beech, has the leaves ovate, acuminate, slightly toothed, ciliate on the margin, acute at base; nut ovate, 3-sided, obtuse, pointed. Of this the American is taken to be a variety, growing in Florida and other southern states. *F. ferruginea*, or red beech, has the leaves oblong

ovate, acuminate, pubescent beneath, coarsely toothed, obtuse, and unequally subcordate at base; nut acutely 3-sided, muricate; most frequent in the northern United States. *F. obliqua* and *Dombeyi*, both having valuable wood and a beautiful crown; *F. procera*, scarcely less towering in height than the araucaria; and *F. pumilia*, a dwarf species growing above the region of trees on lofty mountains, are all natives of the Andes of southern Chili. Some species grow in the Magellanic regions, others in Tasmania and the colder parts of New Zealand. The varieties of the European *F. sylvatica* are: *F. purpurea*, whose bright blood-colored leaves, when tossed by the wind in sunshine, seem to be flames; *F. cuprea*, with copper-colored shining leaves; *F. asplenifolia*, with some leaves entire, and others cut into narrow strips; *F. pendula*, or weeping beech, with branches drooping to the ground; *F. cristata*, with ragged crest-like leaves; *F. variegata*, with leaves spotted with white; *F. latifolia*, with chestnut-like leaves, &c. All these are ornamental trees.—The beech is easily pro-

Beech Leaves, Flowers, and Nut.

pagated from seed, also by grafting, budding, and in-arching. It thrives in a deep moist soil (on the Ohio some attain 100 ft. in height), but also succeeds well in rocky soil, in heaps of stones under cliffs, even in shaded situations. When crowded by its kindred, or by other trees, its stem rises pillar-like even to 80 ft. in undiminished thickness, before branching into a tufty crown, reminding one of Gothic halls. Standing alone, it sends forth branches at from 10 to 30 ft. above the root, at a large angle, far and wide, the lower ones almost horizontal, while the upper rise to form a majestic crown. In depth of shade it is scarcely equalled by any other tree. Its light grayish or leaden-greenish, smooth, shining bark, its rich green, shining foliage, which appears earlier than that of the oak, from long buds in tender drooping jets, and which is tinted yellow, reddish, and brown in the autumn, remaining often through the winter on the tree, recommend it for avenues, plantations, and clumps. Of these there are many in Normandy and other parts of Europe, which abound in beech forests. The diameter of the common beech seldom surpasses 3 ft. The tree scarcely bears fruit before the 50th year of its age, and then not every year. After the 140th year the wood rings become thinner. The tree lives for about 250 years. Some stems are fluted, some even twisted. The roots stretch far away, near to the surface of the soil, partly above it. Young beeches are useful for live hedges, as they bear pruning, and as their branches coalesce by being tied together, or by rubbing each other. Amputations of limbs and deep incisions in the tree soon become obliterated by the bark, which contains a peculiar periderme. The wood is yellowish white in the common beech, brownish in the red; very hard, permeated by transverse lighter-colored pith rays and shorter rays, so that the longitudinal fibres are somewhat waving. Its close wood cells, with thick walls, afford a great quantity of heating material and of potash, so that the wood ranks next to hickory, oak, and maple as fuel. It is easily decayed by alternation of dryness and moisture, and is unfit for many purposes; but it is good for cylinders for polishing glass, for plane stocks, chair posts, shoe lasts, tool handles, wheel felloes, cart bodies, rollers, screws, bowls, and even for ship building where no better timber can be obtained. It is incorruptible when constantly under water. The tree is so rarely struck by lightning that woodmen and Indians consider themselves safe when under its shelter. Very good oil may be pressed from the beech nut, almost equalling that of olives, and lasting longer than any other after proper purification. Wild animals feed on the nut, swine are fattened on it, and people eat it in Europe; too freely eaten, it produces giddiness and nausea. The husks of the nut contain fagine, a peculiar narcotic extractive principle.

BEECHER, Lyman, D. D., an American clergyman, born in New Haven, Conn., Oct. 12, 1775, died in Brooklyn, N. Y., Jan. 10, 1863. His ancestor in the fifth ascent was among the earliest emigrants to New England, having settled at New Haven in 1638. His mother dying shortly after his birth, he was committed to the care of his uncle Lot Benton, by whom he was adopted as a son. He entered Yale college, where, besides the usual collegiate course, he studied theology, and graduated in 1797. During his collegiate course he had given a foretaste of the zeal and eloquence for which he was afterward noted. In 1798 he was ordained pastor of the Congregational church at East Hampton, near the E. extremity of Long Island, and shortly afterward married his first wife, Roxana Foote. His salary was only $300, after five years increased to $400, besides the occupancy of a dilapidated parsonage. To eke out this scanty income his wife opened a private school, in which the husband

gave instruction. Mr. Beecher soon became one of the foremost preachers of his day. A sermon which he preached in 1804, upon occasion of the death of Alexander Hamilton in a duel with Aaron Burr, excited great attention. Finding his salary wholly inadequate to support his increasing family, he resigned the charge, and in 1810 was installed pastor of the Congregational church at Litchfield, Conn. Here he remained for 16 years, during which he took rank as the foremost clergyman of his denomination. The vice of intemperance had become a common one in New England, even the formal meetings of the clergy being not unfrequently accompanied by gross excesses. Mr. Beecher resolved to take a stand against this vice, and about 1814 preached and published his famous six sermons on intemperance, which contain passages the eloquence of which is hardly exceeded by anything in the English language. During his residence at Litchfield arose the Unitarian controversy in New England, in which he took a prominent part. Litchfield was at this time an educational centre, being the seat of a famous law school and of several other institutions of learning. Mr. Beecher (now a doctor of divinity) and his wife undertook to supervise the training of a number of young women, who were received into his family. Here too he found in time his salary, $800 a year, inadequate to the necessities of his large family. In 1826 he received a call to become pastor of the Hanover street church in Boston, where he remained for six years, which were the most active and laborious of his life. The religious public had become impressed with the growing importance of the great west; a theological seminary was founded at Walnut Hills, near Cincinnati, Ohio, and named Lane seminary, after one of its principal benefactors. In 1832 Dr. Beecher accepted the presidency of this institution, which he retained for 20 years, being at the same time for 10 years pastor of the second Presbyterian church in Cincinnati. In 1833, during the absence of Dr. Beecher, the trustees of the seminary prohibited the open discussion of slavery by the students, a large majority of whom withdrew. In 1835 Dr. Beecher, who has been styled "a moderate Calvinist," was arraigned before his presbytery on charges of hypocrisy and teaching false doctrine; he was acquitted, and an appeal was taken to the synod, which decided that there was no foundation for the charge. When the disruption took place in the Presbyterian church, he adhered to the New School branch. In 1852 he resigned the presidency of Lane seminary, and returned to Boston, proposing to devote himself mainly to the revisal and publication of his works, though not unfrequently preaching, and for a time with much of his former eloquence. But his intellectual powers began to decline, while his physical strength remained unabated. Memory first failed, then the capacity for expression. The last ten years of his life were passed in Brooklyn, N. Y., the residence of his son Henry Ward Beecher. Dr. Beecher was a man of great intellectual power, though not a profound scholar. His sermons were usually extempore as far as form was concerned, but were carefully thought out, often while engaged in active physical exercise; but his writings were elaborated with the utmost care. He had some striking personal peculiarities. He was proverbially absent-minded, and after having been wrought up by the excitement of preaching was accustomed to let himself down by playing "Auld Lang Syne" on the fiddle, or dancing the "double shuffle" in his parlor. His autobiography and life has been prepared by some of his children, the autobiographical part occupying only a subordinate place. Three volumes of his collected works, revised by himself, were published in 1852. He was three times married, in 1799, 1817, and 1836, and was father of 13 children, of whom 11 are living (1872). One died in infancy, and another, George, a promising clergyman, died in 1843 from the accidental discharge of his own gun. Of the remainder, the following have attained distinction. **II. Catherine Esther,** born at East Hampton, Long Island, Sept. 6, 1800. When quite young she was betrothed to Prof. Fisher of Yale college, who perished by shipwreck off the coast of Ireland while on a voyage to Europe, and she has remained unmarried. In 1822 she opened a school in Hartford, Conn., which she continued for ten years, during which she prepared some elementary books in arithmetic and mental and moral philosophy. In 1832 she accompanied her father to Cincinnati, where she opened a female seminary, which she was obliged to discontinue after two years on account of ill health. She thenceforth devoted herself to the development of an extended plan for female education, physical, social, intellectual, and moral. In this she has labored more than 30 years, organizing societies for training teachers and sending them to the new states and territories, and for other related objects, writing much for periodicals, and publishing the following books: "Domestic Service," "Duty of American Women to their Country," "Domestic Receipt Book," "The True Remedy for the Wrongs of Woman," "Domestic Economy," "Letters to the People on Health and Happiness," "Physiology and Calisthenics," "Religious Training of Children," "The American Woman's Home," "Common Sense applied to Religion," and "Appeal to the People, as the authorized Interpreters of the Bible." Apart from the books relating to her special educational purpose, she has written memoirs of her brother George Beecher, and "Truth Stranger than Fiction," an account of an infelicitous domestic affair in which some of her friends were involved. **III. Edward,** D. D., born at East Hampton, L. I., in 1804. He graduated at Yale college in 1822, studied theology at Andover and New Haven, and was

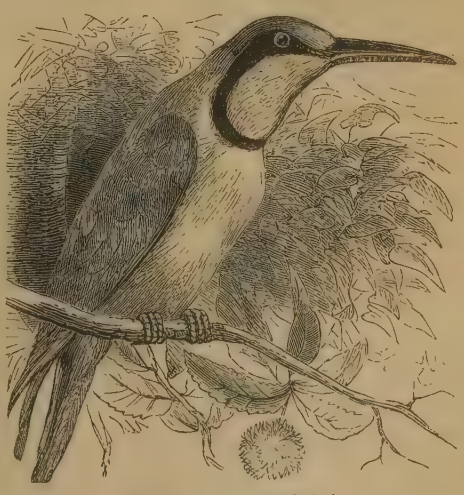
pastor of the Park street Congregational church, Boston, from 1826 to 1831. In the latter year he was elected president of Illinois college, Jacksonville, where he remained till 1844, when he returned to Boston as pastor of the Salem street church; and since 1856 he has been pastor of the Congregational church at Galesburg, Illinois. His works are: "Baptism, its Import and Mode" (New York, 1850); "The Conflict of Ages" (Boston, 1854); "The Papal Conspiracy" (New York, 1855); and "The Concord of Ages" (New York, 1860). Few works in speculative theology have attracted more attention than the two on the "Ages." The central idea presented in them is that man's present life upon earth is the outgrowth of a former, as well as a prelude to a future one; that during the ages a conflict has been going on between good and evil, which will not be terminated in this life; but that sooner or later all the long conflicts of ages will become harmonized into an everlasting concord. **IV. Henry Ward,** born at Litchfield, Conn., June 24, 1813. He graduated at Amherst college in 1834, and studied theology at Lane seminary. In 1837 he became pastor of a Presbyterian church at Lawrenceburg, and in 1839 at Indianapolis, Ind. In 1847 he received a call from the Plymouth church, a new Congregationalist organization in Brooklyn, N. Y. Here almost from the outset he began to acquire that reputation as a pulpit orator which has been maintained and increased during a quarter of a century. The church and congregation under his charge are probably the largest in America. He has always discarded the mere conventionalities of the clerical profession. In his view humor has a place in a sermon as well as argument and exhortation. He is fond of illustration, drawing his material from every sphere of human life and thought; and his manner is highly dramatic. Though his keen sense of humor continually manifests itself, the prevailing impression given by his discourses is one of intense earnestness. The cardinal idea of his creed is that Christianity is not a series of philosophical or metaphysical dogmas, but a rule of life in every phase. Hence he has never hesitated to discuss from the pulpit the great social and political questions of the day, such as slavery, intemperance, licentiousness, the lust for power, and the greed for gain. He is an enthusiast in music, a connoisseur in art, a lover of flowers and animals. Apart from his purely professional labors, he is a popular lecturer in lyceums, and orator at public meetings. Before beginning to preach he edited for a year (1836) a newspaper, "The Cincinnati Journal," and while pastor at Indianapolis an agricultural journal, his contributions to which were afterward published under the title, "Fruits, Flowers, and Farming." For nearly 20 years he was an editorial contributor to "The Independent," a weekly journal published in New York, and from 1861 to 1863 its editor; his contributions to this were signed with a ⁂, and many of them were collected and published as "The Star Papers." Since 1870 he has been editor of "The Christian Union," a weekly newspaper published in New York. His regular weekly sermons, as taken down by stenographers, have been printed since 1859, and now (1872) form 10 volumes under the title of "The Plymouth Pulpit." Besides these he has published "Lectures to Young Men;" "Industry and Idleness;" "Life Thoughts," two series edited by Edna Dean Proctor and Augusta Moore; "Sermons on Liberty and War;" "The Plymouth Collection of Hymns and Tunes;" "Norwood," a novel, originally published in the "New York Ledger," to which he is a constant contributor; "Sermons, from Published and Unpublished Discourses" (2 vols., 1870); "Life of Christ" (2 vols., 1871–'2); and "Yale Lectures on Preaching" (1872). In 1863 he visited Great Britain, with a special view to disabuse the public in regard to the issues of our civil war. His speeches exerted a wide influence in changing popular sentiment, which had been strongly in favor of the southern confederacy. They were published in London, but have not been reprinted in America. **V. Harriet Elizabeth (Stowe),** born at Litchfield, Conn., June 14, 1812. During several years she was a teacher in the school of her sister at Hartford, Conn. In 1832 she went with her family to Cincinnati, and in 1836 was married to Prof. Calvin E. Stowe of Lane seminary. In 1849 she published "Mayflower, or Sketches of the Descendants of the Pilgrims," several times republished, with additions. In June, 1851, she commenced in the "National Era," an anti-slavery newspaper published in Washington, a serial story, which was continued till the following April. In 1852 this was issued in two volumes, under the title of "Uncle Tom's Cabin," and achieved an unparalleled success. In four years there had been printed in the United States 313,000 copies, and probably still more in Great Britain. As early as 1862 it had been translated into French (two or three versions), German (13 or 14), Dutch (two), Danish, Swedish, Portuguese, Spanish, Italian, Welsh (two), Russian (two), Polish, Hungarian, (three), Wendish, Wallachian (two), Armenian, Arabic, and Romaic; and it is said that there are also translations into the Chinese and Japanese. The truthfulness of the representations in "Uncle Tom" having been questioned, Mrs. Stowe in 1853 published a "Key to Uncle Tom's Cabin," presenting the "original facts upon which the story was founded, together with corroborative statements verifying the truth of the work." In 1853, accompanied by her husband and her brother Charles, she visited Europe, and gave the results of their observations in "Sunny Memories of Foreign Lands" (1854). Since that time Mrs. Stowe has written much, mainly in periodicals, the papers being subsequently collected into volumes. Among these volumes are: "Dred, a Tale of the Great Dismal Swamp" (1856; republished

in 1866 under the title of "Nina Gordon"); "The Minister's Wooing" (1859); "The Pearl of Orr's Island" (1862); "Agnes of Sorrento" (1863); "Old Town Folks" (1869); "My Wife and I" (1872), and several others. In 1868 the countess Guiccioli put forth her "Recollections of Lord Byron." Mrs. Stowe thereupon, in September, 1869, published in the "Atlantic Monthly" a paper, "The True Story of Lady Byron's Life," in which she undertook to show that Byron had formed an incestuous intimacy with his half-sister, Mrs. Leigh. This paper elicited much comment and many replies. She extended her magazine article into a volume, "Lady Byron Vindicated" (1869), in which she reiterated her original statement, and replied to the animadversions which it had occasioned. In 1868–'70 she was one of the editors of "Hearth and Home," a weekly literary journal of New York. Her home is in Hartford, Conn., but she passes much of her time at her summer residence in Mandarin, Florida. **VI. Charles,** born at Litchfield, Conn., in 1815. In 1844 he was ordained as a clergyman, and became successively pastor at Newark, N. J., and Georgetown, Mass. He has written "The Incarnation" (1849); "Review of the Spiritual Manifestations" (1853); and "Pen Pictures of the Bible" (1855). He aided his brother, Henry Ward Beecher, in the compilation of the "Plymouth Collection of Hymns and Tunes," was joint author with his sister, Mrs. Stowe, of the "Sunny Memories of Foreign Lands," and acted as editor of the life of his father, Lyman Beecher. **VII. Thomas Kennicutt,** born at Litchfield, Conn., Feb. 10, 1824. He graduated in 1843 at Illinois college, of which his brother Edward was president, and engaged in teaching. He afterward became pastor of the New England Congregational church in Williamsburgh, now a part of Brooklyn, N. Y., and about 1857 removed to Elmira, N. Y., where he is now pastor of a church (1872). He has published a volume entitled "Our Seven Churches" (New York, 1870).

BEECHEY, Frederick William, an English navigator, born in London in February, 1796, died there, Nov. 29, 1856. He was a son of Sir William Beechey, the painter. He entered the navy as a volunteer at the age of 10, and saw a great deal of service (including the contest at New Orleans) during the 12 years following, and in 1815 was made lieutenant. In 1818 he sailed in the Trent, under Franklin, on his first voyage of arctic discovery, acting as artist to the expedition, and in 1819 he was lieutenant of the Hecla in Parry's first arctic voyage. In 1821 he was commissioned (with his brother H. W. Beechey) to make a survey of the N. coast of Africa, from Tripoli to Derne. He was raised to the rank of commander, and sent out in 1825 in the Blossom on another arctic expedition, by way of Cape Horn, to act in concert with Franklin and Parry. Having passed Behring strait, he reached in August, 1826, a point N. of Icy cape, and went in boats to lat. 71° 23′ 31″ N. and lon. 156° 21′ 30″ W., only 146 m. from the extreme point simultaneously reached by Franklin. As they were not aware of each other's position, neither advanced. Commander Beechey subsequently discovered, in 1827 (in which year he was made post captain), two secure harbors S. E. of Cape Prince of Wales, and near to Behring strait, which he named Port Clarence and Grantley harbor. He returned to England after an absence of nearly three years. Between 1829 and 1839 he was employed in making surveys of the coasts of South America and Ireland, and in 1854 he was appointed rear admiral of the blue.

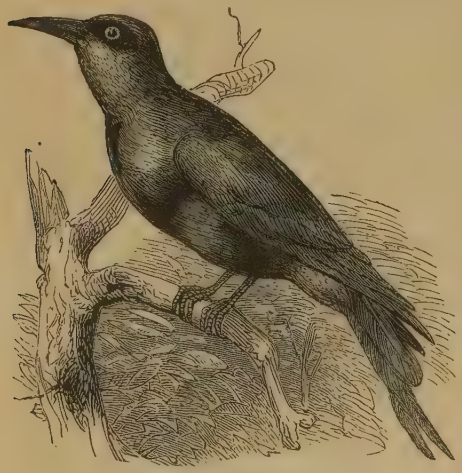
BEECHEY, Sir **William,** an English portrait painter, born at Burford, Oxfordshire, in December, 1753, died at Hampstead, near London, in January, 1839. He was articled to a London attorney, but procured his release at the age of 19, became a student of the royal academy, and closely imitated the style of Sir Joshua Reynolds. For some time he confined himself to portraits, living at Norwich; but having executed some small pieces in the manner of Hogarth, which were very successful, he returned to London, where he obtained numerous commissions for full-length portraits. In 1793 he was elected associate of the royal academy, and appointed portrait painter to Queen Charlotte. In 1797, having painted a good picture of George III., he was knighted, and at the same time made a member of the royal academy.

BEE-EATER, a bird of the genus *merops*, and family *meropidæ*. There are 26 species described, inhabiting most parts of the old world, and migrating from place to place, according to change of season. In the winter they seek the warmest portions of the globe, and the temperate regions in summer, in search of food, which consists exclusively of insects. They commonly perch singly or in small parties on a



Bee-Eater (Merops aplaster).

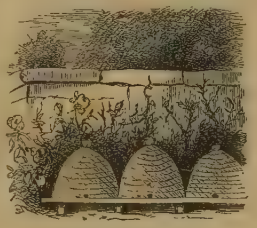
prominent branch, from which they can see all around them. From this they capture insects on the wing, like the swallow, generally returning to the same perch. At morning and evening they often congregate in considerable numbers. Their flight is graceful and sustained; their cry is loud, consisting of pleasant, whistling notes, continued at morning and evening. They rear their young in horizontal holes in the sandy banks of rivers, or in soft rocks which they can excavate. The entrance is small, opening, at the depth of 3 or 4 feet, into a cavity in which the parent can easily turn. The eggs are from 5 to 7 in number, laid on the bare ground, or on moss or other soft material. The common bee-eater (*merops apiaster*, Linn.) inhabits the south of Europe, especially about the Russian rivers Don and Volga, and the northern parts of Africa. It is occasionally seen in England and Sweden. The other species



Bee Wolf (Melittotheres Nubicus).

of the genus are found in Africa, Asia, and the Indian archipelago. The common species is about 10 inches long; the bill 1¾ inch, black and pointed; eyes red; forehead bluish green, and behind it green; top of the head chestnut, with a green tinge; hind head and upper part of neck chestnut, paler toward the back; from the bill is a black stripe, passing through the eye; the back and scapulars pale yellow, tinged with chestnut and green; rump and upper tail coverts blue-green, with a yellowish tinge; throat yellow; under parts blue-green, palest on the belly; lesser wing coverts dull green; quills mostly sea-green without, and many of the inner rufous—the first very short, the second the largest of all; the tail wedge-shaped, of 12 feathers, the shafts brown above and whitish beneath, the two middle ones sea-green, shaded with rufous, and the longest by nearly an inch; claws black. In Egypt this species is eaten as food. The eggs are white. It receives its name from the insect which is its favorite food, though it feeds on most of the winged insects, which it takes as it flies.—One of the most beautiful of the African genera is the bee wolf (*melittotheres Nubicus*), a bird of the most brilliant plumage. Its back is of a deep red color, its under side rose pink. The head, throat, and portions of the tail are of a bluish green; while a black stripe runs from the corner of the beak to the ear. The tips of some of the longest feathers are also black. The eyes are red, the feet brown, and the beak black. The bird is generally about 13 inches in length, and its breadth of wing is about 12 inches. It inhabits eastern Africa.

BEE-KEEPING. The apiary should be well sheltered from strong winds, either naturally or by building walls or close, high fences, and should face the south, the east, or the south-east, so as to get the sun during the day. If it is not so sheltered, in a high wind the bees are unable to strike the hive and are blown to the ground, where they are chilled and die. It should not be near large surfaces of water, lest the bees, overcome by cold or fatigue, should be forced to alight on them, or be carried down by the wind. After a suitable place for an apiary is selected, the hives should not be moved over a few feet; for when the bees first fly out in the spring they mark the location and take note of immediately surrounding objects as guides for their return. The hives should be placed in a right line; the distance between the hives should not be less than two feet. In some apiaries their height from the ground is from one to two feet, but many bee-keepers of experience raise the platform only two inches from the earth, because fewer of the fatigued or chilled bees that miss the hive in returning and alight under it are lost, the flight of issuing swarms is lower, and there is less exposure to strong winds. Grounds on which there are no large trees, but some of small size and shrubbery, on which the swarms may alight, are preferable. The grass should be mown frequently around the hives, and the ground kept clean, to prevent too much dampness, and to destroy the lurking

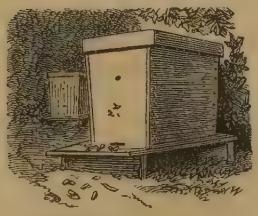


Hives near the Ground.

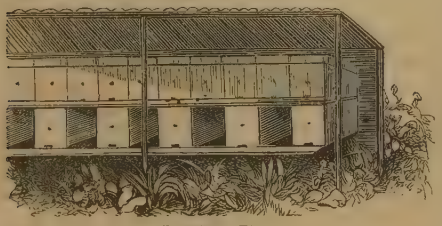
Hives on Two-foot Pedestals.

places of noxious insects and vermin. The hives should be on separate stands, to prevent the bees from running from one hive to another, and should be of different, not glaring colors, as guides to the bees.—The chamber hive is made with two apartments—the lower for the residence of the bees, the upper to hold the boxes in which the bees put their honey after having filled the lower part. These hives are sometimes made several inches narrower from front to rear at the bottom than at the top, to prevent the comb from slipping down. They are also sometimes furnished with inclined bottom boards to roll out the worms that fall upon them, or are driven down by the bees. To protect the bees from vermin, several kinds of suspended hives have been contrived with inclined movable bottom boards. The dividing hives are made with several compartments, so as to multiply at the will of the bee-keeper the number of colonies, without the trouble and risk of swarming and hiving. By means of these hives, the partitions of which are supposed to divide the brood combs, a part of the bees and of the combs are removed and placed by themselves to go on making honey, and multiplying in every respect like a natural swarm. In many instances, however, where a swarm is divided, in one apartment there will be no brood from which to raise a queen.—Several inventions have been made to enable the bee-keeper to change the combs and get the honey without driving out or destroying the bees. Changeable hives are made in sections, generally three drawers placed one above another, with holes to allow the bees to pass. When the boxes are all filled, and it is desired to change the combs, the upper box is removed, and its place supplied by a new one put in at the bottom. It is held that there is a necessity for changing the brood combs, because the larvæ hatched from the eggs and sealed up in the cells there spin their cocoons, which remain when they go out, upon the walls of the cells. This deposit, although extremely thin, diminishes the size of the cell, affording less room for each succeeding generation, thus causing the bees to gradually deteriorate in size. On the other hand, it is denied that deterioration is caused in the bees by the filling up of the brood cells, even if the same combs are hatched from 12 years, and time and honey are therefore needlessly wasted by keeping the bees constantly making new brood comb. It is estimated by some writers that in elaborating a pound of wax the bees will consume 25 lbs. of honey, besides losing the time when they might be laying up further stores. The difficulty of putting the swarms into these hives, and the many lurking places they afford to the bee moth, and also the difficulty of procuring, in this method of taking away honey, that which is good and free from cocoons and bee bread, more than counterbalance, in the opinion of many bee-keepers, their advantages. —Swarming hives are sometimes used. They are made with sections, so that by closing all or a part of them the space which the bees occupy is lessened, and they are crowded out, and their swarming hastened. Non-swarmers are arranged so as to allow the bees to go on accumulating honey and increasing in number, and in theory not swarm at all. A hive of bees is put into a bee house, and empty hives connected with it, so that as soon as one becomes filled the bees pass to the adjoining ones. In some instances more surplus honey has been obtained by this method; but giving the bees

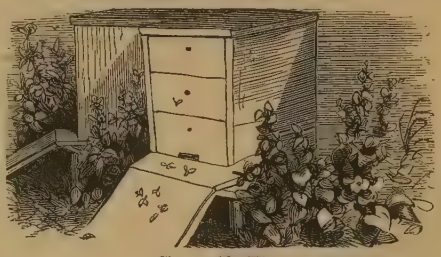
Chamber Hive.



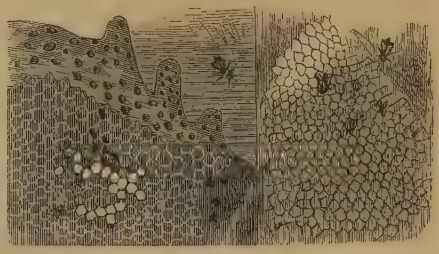
Tapering Hives.



Dividing Hives.



Changeable Hive.



Comb.

any amount of room will not prevent their swarming. The result of all the experiments tends to show the superiority, for practical purposes, of the simpler hives. For protection against the extremes of heat and cold in summer and winter, straw hives are excellent.—In Poland, where finer honey is produced and bees are more successfully managed than elsewhere in Europe, hives are made by excavating trunks of trees, taking logs a foot or more in diameter and about 9 feet long. They are scooped out or bored for the length of 6 feet from one end, forming hollow cylinders, the diameter of the bore being 6 or 8 inches. A longitudinal slit is made in the cylinder nearly its whole length, and about 4 inches wide. Into this is fitted a slip of wood with notches on the edges large enough to admit a single bee. This slip is fastened in with wedges or hinges; if it is in several parts, it will often be found more convenient. The top is covered, and the trunk set upright with the opening toward the south. Through the door the condition of the entire swarm is seen, and the honey taken from time to time.—One of the best hives is made of pine boards an inch thick, 12 inches square inside, and 14½ deep. Instead of a top, with holes to allow the bees to ascend to the boxes, there should be slats three fourths of an inch wide and an inch thick, half an inch apart, three quarters of an inch below the top of the hive. Four or five quarter-inch strips at equal distances across the slats will be even with the top of the hive, and on these the surplus boxes can be set. Over all should be a cover or cap 14 inches inside and 7 inches high. A hole an inch in diameter in the front side, half way to the top, furnishes an entrance for the bees, and additional entrances may be made at the bottom on the sides. If glass boxes are used to receive the honey, guide comb must be placed, as bees will rarely build on glass without it. Glass boxes are the most profitable, as they show the honey to the best advantage, and are sold by weight with the honey, which pays their cost. A separate cover for each hive may be easily made by putting together two boards, letting them incline to each other so as to form a roof. It is necessary to guard against shading the hives too much in spring and fall, against preventing a free circulation of air all around them in summer, and exposing them too much in the middle of the day to the sun. The bee house should not, in cool weather, make the temperature around the hives much higher than the bees will encounter at a distance. Simple movable covers, which are easily adjusted as the season demands, with hives made of boards of sufficient thickness, well painted to prevent warping and cracking, will generally prove an ample protection, except in winter, when the hives must be housed, or covered with straw mats. In the movable comb hive each comb is suspended in a frame and the top is not fastened, permitting combs to be removed for examination or for transfer to other hives; drone comb may be cut out and working comb substituted; swarming for the season, after one swarm has issued, can be stopped by cutting off all but one of the queen cells; moth-worms can be detected and destroyed; and the amount of brood the colony shall raise can be controlled.—The new swarms generally appear during the months of June and July, but sometimes as early as May or as late as August, and in good seasons Italian bees have swarmed at intervals for three months. The swarms are usually hived, when the branch or whatever they alight on can be removed, by shaking them off in front of the hive, a little raised on one side to allow their passage. When they collect where they cannot be shaken off, and the hive cannot be placed near, they may be brushed quickly into a sack or basket and carried to the hive. It is irritating to the bees and useless to endeavor to make the swarms collect by a din of horns, tin pans, and bells. They will sometimes collect on a pole with a few branches, some broom corn, dry mullein tops, or similar things fastened to the end and held in the air. They may sometimes be arrested when going off by throwing water or earth among them. It is very seldom that a swarm starts for its chosen destination without previously alighting. If two or more swarms issue at the same time and unite, they may be separated, if desired, by shaking them from the branch between two or more hives placed near together. Should the queens enter the same hive, the bees must be shaken out between empty hives as before, and this operation repeated till the queens separate, or the bee-keeper is able to catch one or

Polish Hive.

Swarming Bees.

more of them, and put them with the bees where wanted. Or if there are only two swarms united, a part may be separated and returned to the parent hives, and the rest put into one hive; or they may all be put into one, and boxes put on immediately. It is sometimes desirable to unite small swarms; this may be easily done, if they issue about the same time, by inverting one hive and placing the other over it; the bees in the lower will ascend. When it is desirable to defer for a short time the issuing of a swarm which the signs indicate to be just at hand, the bees on the outside of the hive should be sprinkled with water. This is effectual only before the swarm has started. Sometimes the swarm issues and returns several times; if this is owing to the inability of the queen to fly, she should be found if possible, and put with the others in the new hive. It has been proved by the movable comb hive that the old queen, if she can fly, always leaves with the first swarm. If the weather should be such as to prevent the new swarms from going out to collect honey for several days immediately after being hived, it may be necessary to feed them.—The general use of box and movable comb hives makes it unnecessary to kill bees to get the honey. In other hives the bees may be stupefied with chloroform, sulphur, or tobacco smoke. The comb when taken should be cut off clean so that the honey may run as little as possible upon the bees. Polish apiarians cut out the old comb annually to lessen the tendency to swarming, and thus obtain the largest amount of honey. The old practice of destroying the bees, except those which are intended for wintering, after the hives have been filled and the honey season has passed, still prevails, and La Grenée gives many reasons proving this to be profitable. The time for taking up hives depends somewhat on the season and the bee pasturage. The quantity of honey does not increase generally after Sept. 1. The bees are suffocated by burning sulphur, are buried to prevent resuscitation, and the honey removed. The bees are sometimes deprived of the entire store of comb and honey in the early part of the season, generally after the leaving of the first swarm, and driven into a new hive. When the old hive is infested with moths, or the comb is not good, and it is desirable to winter the bees, this operation may be expedient. It is performed by inverting the hive, and putting the other, into which the bees are to be driven, over it, making the junction close, and tapping with the hand or a stick the sides of the hive; the bees will pass up to the new hive, which is to be then removed to the stand.—Hives are sometimes attacked and robbed, either because they are too weak or other bees are attracted by broken honeycomb or by food put near the hive. To protect it after the robbery has commenced, the hive should be removed to the cellar, or some cool dark place, and allowed to remain two or three days. It is sometimes sufficient to close the entrance to the hive so as to admit but one bee at a time. It is beneficial to put a similar hive in the place of the one removed, and rub on the bottom board wormwood leaves or the oil of wormwood. This is so disagreeable to the bees that they speedily forsake the place. Breaking the comb in the hive of the robbers will generally make them desist.—The quantity of honey usually necessary for wintering safely a swarm of bees is 30 pounds; and it is known that two colonies put into one hive will consume but few more pounds than one swarm, probably because of the increased warmth in the hive. Those that are found in the autumn to be weak in numbers and with a scanty supply of honey should be united with another weak colony to make a new and strong stock. Only the strong swarms are profitable to winter. Feeding should begin in October, so that the honey may be sealed up before cold weather. Brown sugar made into candy by being dissolved in water, clarified and boiled to evaporate the water, is a good food for bees. The sirup should be boiled till it begins to be brittle when cooled. This or common sugar candy may be fed to bees in the hives, under them, or in the boxes. If fed in the liquid state, it may be introduced into the hives in dishes, some contrivance being made to enable the bees to eat it without getting into it. Honey is of course the best food, and movable combs may easily be transferred from well supplied to destitute colonies. The object in feeding bees in spring is to induce early swarming. Feeding should never be attempted as a matter of profit. Clover is the principal source of supply for the bees. Fruit tree, basswood, locust, and maple blossoms yield abundantly and of fine quality; buckwheat furnishes a large quantity, excellent for the winter food of bees, but inferior for the table.—The bee moth is the greatest foe the apiarian has to contend with. The best safeguard against this pest is to have the hive well jointed and painted, the entrances not too large, the bees vigorous and numerous, and to examine the hive daily from about May 1 till September or October. In the daytime the moths remain in their hiding places, and may often be found around the hive. They are on the wing in the evening, hovering around the apiary or running over the hives, endeavoring to enter and deposit their eggs. Many may be destroyed by entrapping them in shallow dishes of sweetened water with a little vinegar added. Hollow sticks, small shells, and similar things are often placed on the bottom board, where the worms hatched from the eggs may take refuge and be destroyed. It is necessary to look often under the bottom of the hive, and if one side is raised (as is required for ventilation in warm weather), under the blocks or shells on which it rests. These caterpillars at first are not thicker than a thread, and are of a yellowish white color with a few brownish

dots. They live in the wax, eating it, and filling the comb with webs. They protect themselves from the bees by a sort of silken sack, which they spin, and in which they lodge. When they have attained their full size, which requires about three weeks, they spin their cocoons; in these they remain enclosed some time, and change to chrysalids of a light brown color, with a dark elevated line along the back. A few days afterward they are transformed to winged moths and issue from the cocoons. Rats and mice do not attack the hives except in winter, unless the comb is unprotected by bees. Spiders sometimes spin their webs upon and around the hives. There is a disease called foul brood, which is very destructive to the young bees in the larva state; they die in the cells, and become black and putrid. The disease appears to be in a measure infectious. The only remedy is to drive out the bees into a new clean hive. It is the practice in some parts of Germany to put the bees into a temporary hive, and let them remain 24 hours, without food, in the dark, before settling them in the new hive. The disease is attributed sometimes to feeding the bees with foreign honey; the infection being conveyed by the honey, which, to be safely fed, should be previously scalded.—In wintering bees it is necessary to protect them especially from freezing and starving. The latter happens when they collect together closely, in the coldest weather, and the comb becomes covered with frost and ice, excluding them from the honey. This is obviated by putting straw in the cover, after the removal of the boxes, to collect the moisture. The entrance to the hive is liable to be stopped with ice, and the bees thus suffocated. The bee never passes into the actually torpid state in winter, like some other insects. It requires less food when kept warm and comfortable. If the hives are to be carried into a house or cellar, the place for them should be cool, dry, and dark. The best method is to house them, unless sufficient protection can be given them on the stands. Russian and Polish bee-keepers winter their hives on the stands; but they make them of inch and a half plank, and wind the upper part with twisted straw or cordage. If left on the stands, hives made of common boards need additional covering; the entrance should also be narrowed so as to leave only space enough for a single bee to pass. Light snow may cover the hive without danger.—The time for carrying bees out from their winter quarters is in March, except in very backward seasons. A few bright cold days will not be more destructive to them than too long confinement. If new snow has fallen, and the weather is not sufficiently warm for them to venture into the air safely, the hive may be shaded from the sun, or the bees confined in the hive. If they are to stand very near each other, it is not well to carry out too many hives at once, the bees at first not readily distinguishing their own. The hives should be raised from the bottom board only on one side, if at all. Many prefer, if the bees are not especially numerous, to let the hive rest entirely on the board, allowing less room for passage, and securing greater defence against intruders. More ventilation than this affords may be required in warm weather, when, if liable to suffer from heat, the hive may be raised entirely, proper means being furnished for the bees to ascend from the bottom board.—European apiarians have devised means for weighing hives so as to show the increase in the weight of honey from day to day; but the use of glass boxes and movable frames for combs permits inspection of the progress of the work at any time and renders weighing unnecessary.—Bee-keeping has in some instances been made very profitable. It is, however, uncertain. Much depends on the season and on the pasturage. Mr. M. Quimby, in "Mysteries of Bee-Keeping Explained" (New York, 1865), says that an area of a few square miles in the vicinity of St. Johnsville, N. Y., in some favorable seasons has furnished for market more than 20,000 lbs. of surplus honey; and it is estimated that in good localities every acre in the country would yield a pound. A single colony has been known to give a profit of $35 in a season; 90 stocks have given $900 profit; and a New York apiarian reports for 130 hives $1,800 profit in a single season. Owing to the difference in the seasons, it is impossible to know how many stocks can be kept in given localities in the United States. One of the provinces in Holland has an average of 2,000 hives to the square mile. In an area of 45 square miles in Attica, Greece, it was estimated in 1865 that there were 20,000 hives. In all ages the abundance of flowers in Attica has made Hymettus famous for its honey; and as long ago as 1681, when Sir George Wheler visited the monks of Mendeli, a monastery of Pentelicus, they had 5,000 hives.—In 1860 a few colonies of the Italian or Ligurian bee (*apis ligustica*), which had long been a favorite with European apiarians, were imported into the United States, where they are now among the most popular, prolific, and profitable bees kept in the country. Their superiority over the native bee appears in their larger size and greater beauty; they are more prolific, longer-lived, more industrious, less sensitive to cold, and they swarm earlier and more frequently, and continue later than common bees. The Rev. L. L. Langstroth, author of a well-known "Practical Treatise on the Hive and the Honey Bee," says his Italian colonies gathered more than twice as much honey as the swarms of the common bee; and Mr. Quimby, a practical bee-keeper of many years' experience, says he has not received a single unfavorable report of them. They are said to be a valuable acquisition to localities of high altitude, and are peculiarly adapted to the climate of Washington, Oregon, and the mountainous regions of California. The introduction of these bees into the United States has led to the Italianizing of

whole apiaries, and to the production of numerous and superior hybrids, sometimes by design and again by the proximity of Italian and native swarms, though apiarians consider purity in swarms desirable.

BEELZEBUB, or **Beelzebul,** a heathen deity, to whom the Jews in the times of the apostles ascribed the sovereignty over evil spirits. It is supposed to be identical with the Baalzebub, fly god, of the Ekronites (see BAAL), the final *b* being in later times changed to *l* in pronouncing the word. Others find in the last element the Hebrew word *zebul*, "habitation," and consider Beelzebul to mean "lord of the house;" others refer it to the Heb. *zebel*, "dung," and render the name "dung god." Hug ingeniously suggests that the form under which the Philistine deity was worshipped was that of the *scarabæus pillularius*, the dunghill beetle, in which case Baal-zebub or Beelzebul would be equally appropriate. The name appears nowhere in the rabbinical writers.

BEEMSTER, the largest of the *polders* or tracts of drained land of the Netherlands, about 12 m. N. of Amsterdam; area, 8,000 acres. The district contains a neat village of about 2,600 inhabitants, chiefly employed in raising sheep and cattle.

BEER (Ger. *Bier*), a fermented liquor made from malted grain, in Europe most commonly from barley, but in this country from wheat as well, and in India from rice. Corn, oats, peas, and similar articles of food may also be used for its manufacture. Hops and other bitter substances are added to improve the flavor, and to impart their peculiar properties to the liquor. The name beer is also given in this country and in Britain to several partially fermented extracts of the roots and other parts of plants, as spruce, sassafras, ginger, &c., most of which are designated by the term root beer; but as generally used in Europe, it is applicable only to liquors prepared by malting, and seasoned with hops or other bitters. The drink in some of its varieties appears to be of great antiquity, and was probably discovered by the Egyptians. Tacitus notices it as being in common use with the Germans of his time. Pliny describes the *celia* and *ceria*, the beer of the Spaniards, and the *cerevisia* of the Gauls, made from almost every species of grain, and evidently named from Ceres, the goddess of corn. Aristotle speaks of its intoxicating qualities, and Theophrastus very properly calls it the wine of barley. Herodotus (450 years B. C.) stated that the Egyptians made their wine of barley. An ancient description by Isidorus and Orosius of the process in use by the Britons and Celtic nations defines the liquor as not differing essentially from that now made. "The grain is steeped in water and made to germinate, by which its spirits are excited and set at liberty; it is then dried and ground, after which it is infused in a certain quantity of water, which, being fermented, becomes a pleasant, warming, strengthening, and intoxicating liquor." Beer is a nourishing drink from the gum, sugar, and starch it holds in solution; and the bitter substances combined with it impart their tonic properties. The proportion of alcohol is small. In the Edinburgh ale it has been found by Mr. Brande to amount to 6·20 per cent.; in brown stout, to 6·80; Burton ale, 8·88; London porter, 4·20; small beer, 1·28. Burton, or the pale India ale, as found by Hoffmann, contains, in 100 parts: water, 78·37; extract of malt, 14·97; absolute alcohol, 6·62; and carbonic acid, 0·04. Pale ale consists of the same ingredients, in the following proportions: water, 89·74; extract of malt, 4·62; alcohol, 5·57; carbonic acid, 0·07. Lactic acid, aromatic matters, and various salts are detected in the extract.—Although the term beer is generally applied, as above stated, to all kinds of fermented liquors made from malt, a distinction is made between the heavier and lighter kinds. The more spirituous liquor, made in England and in this country, is commonly called ale, the name given to it before the use of hops (Anglo-Saxon, *eala*). Upon the introduction of hops into England the word beer (*Bier*) was also imported, and was used to distinguish the liquor made with hops from the more ancient beverage. A distinction is made by the German brewers between ale and beer on account of the two different modes of fermentation which are employed; ale being produced by rapid fermentation, in which the yeast rises to the surface (*Obergährung*), while beer is fermented in cool cellars by a slow process in which the yeast settles to the bottom of the vessels (*Untergährung*). The latter is the Bavarian method, which is employed in brewing *Lagerbier*, *Schenkbier*, &c. The term lagerbier is indiscriminately applied in this country to the light kinds of beer which are prepared by the slow process of fermentation. Much of this beverage, however, is not genuine lagerbier, for it has not lain a sufficient length of time in the cellar to acquire that title; nor could it have been preserved in casks during the time in which lagerbier is ripening. It is more technically termed, and is known by the brewers as *Schenkbier* (*schenken*, to pour, to retail drinks), *i. e.*, draught beer, or beer ready to be drawn. It contains less alcohol than genuine lager, and less than the various kinds of beer which are brewed in Bavaria, and corresponds to what is known in this country as "present use ale," or the new ale commonly kept in the ale houses. It occupies much less time in fermenting, and has not the keeping properties of German lager, or of the various kinds of Bavarian beer. To Germany we owe not only the general introduction of beer, but also most of the improvements which have been made in its manufacture. There are many kinds of beer brewed in Bavaria, and also in other parts of Germany, which receive particular names, as *Bock*, *Heiliger Vater*, Augustine double, and Salvator, of Mu-

nich; brown beer of Merseburg; Berlin white beer, or champagne of the north; Broyhan, a famous Hanoverian beer; double beer of Grünthal; and white bitter beer of Erlangen, Lichtenhain, and Upper Weimar. All these possess various excellences, particularly the Bavarian beers, most of which are due to the peculiar mode of fermentation. Usually, what is called ale contains a smaller quantity of hops than beer, although the term bitter beer is often applied to the East India pale ale, which, besides being very heavy, contains a larger proportion of hops.—Porter was first made in England in 1730. Previous to that time the malt liquors in London were ale, beer, and twopenny. It was customary to call for half and half, or for three threads. To avoid the necessity of drawing from two or three casks, a brewer named Harwood produced a beverage which was intended to embrace the qualities of the three liquors. It was called entire, or the entire butt; and being a strong, nourishing drink, suitable for laboring men and porters, it received at last the name of porter. It is made from malt, a portion of which has been to a certain degree roasted; consequently it has a deeper color than the other kinds.—The following table, from Watts's "Dictionary of Chemistry," exhibits analyses of some celebrated European beers, by Kaiser, Hoffmann, Otto, and others:

NAME OF BEER.	Malt Ext.	Alcohol	Carb. Acid.	Water.
London porter	6·0	5·4	0·16	88·44
Burton ale	14·5	5·9	....	79·06
Scotch ale	10·9	8·5	0·15	80·45
Brussels lambik	3·4	5·5	0·20	90·90
Salvator, Munich	9·4	4·6	0·18	85·85
Bock, Munich	9·2	4·2	0·17	86·49
Bavarian draught (Schenk)	5·8	3·8	0·14	90·26
Bavarian, 16 months old	5·0	5·1	0·15	89·75
Prague draught	6·9	2·4	....	90·70
Prague Stadtbier	10·9	3·9	....	85·20
Brunswick sweet beer	14·0	1·4	....	84·60
Josty's beer, Berlin	2·6	2·6	0·50	94·30
Werder's brown beer, Berlin	3·1	2·8	0·30	94·20
Berlin Weissbier	5·7	1·9	0·60	91·80
Bière blanche de Louvain	3·0	4·0	....	93·00
Brunswick mum	45·0	1·9	....	53·10

—The amount of fermented liquors brewed in the United States during the year ending June 30, 1871, according to Mr. Louis Schade, a statistician, was 7,159,740 bbls. Of this amount New York produced 2,305,145; Pennsylvania, 918,986; Ohio, 656,896; Massachusetts, 525,731; New Jersey, 514,189; and North Carolina, 51 bbls. The total brewers' tax in 1871 was $7,387,501. The number of breweries in the United States in 1870 was 2,862. Of the ale brewers, only one brewed over 100,000 bbls. Four breweries produced over 70,000 bbls. each. One lagerbier brewery produced over 40,000 bbls. The number of breweries in England in 1870 was 2,671. The ale and beer brewed amounted to 50,724,086 bbls., the duty upon which was £6,878,102. Allsop and Sons employ 1,300 persons in Burton, of whom 100 are clerks. Their two breweries are capable of producing 16,000 bbls. of ale per week. The new brewery covers 40 acres, and the ground is traversed by 12 miles of rail. In Austria and Hungary, in 1871, there were 2,699 breweries, which produced in Austria 7,918,433 bbls., and in Hungary 630,938 bbls. of beer, of which there were exported 126,336 bbls. The German states, excluding Bavaria, Würtemberg, and Baden, produced from January to May, 1872, four months, 3,733,769 bbls. of beer, and during the same time there were exported 2,576 bbls. Bavaria produced in 1871 about 4,285,000 bbls.

BEER. I. Wilhelm, a German astronomer, of Jewish parentage, the brother of Meyerbeer, the great composer, born in Berlin, Feb. 4, 1797, died March 27, 1850. His regular profession was that of a banker, but he devoted much of his time to his favorite study of astronomy, working in conjunction with Mädler. Beer built an observatory in the Thiergarten at Berlin, chiefly devoted to the observation of the planet Mars and the moon. The crowning labor of the two astronomers was a map of the moon published in 1836, upon which the Lalande prize was conferred by the French academy. In 1849 Beer became a member of the Prussian diet. **II. Michael,** a dramatist, brother of the preceding, born in Berlin in 1800, died in Munich, March 22, 1833. He became known in literature by five tragedies, of which his *Struensee* is the best. His complete works were published at Leipsic in 1835, and his "Correspondence" in 1837. (See MEYERBEER.)

BEER-SHEBA (Heb. *Beer Sheba'*, well of swearing or well of seven), an ancient town on the southern border of Palestine, 38 m. S. S. W. of Jerusalem, of which only the ruins are now visible. It took its name from one of two wells still existing near the site. According to one Biblical account (Gen. xxi.) the more ancient one was dug by Abraham and received the name from the fact that he and Abimelech, king of the Philistines, "swore there" a covenant, and ratified it by the setting apart of "seven" ewe lambs. Another account (Gen. xxvi.) conveys the impression that Isaac instead of Abraham was the digger of the well. Of the two principal wells at Beer-sheba, the larger one is 12½ ft. in diameter and about 44 ft. deep to the surface of the water; the other, 100 yards further W., is 5 ft. in diameter, and has about the same depth. Both are surrounded by masonry, the inner edge of which, as in other wells of the country, is worn into deep grooves by the friction of the ropes used in drawing up water. These two wells lie near the N. bank of the Wady es-Seba, and a short distance from them is a group of five smaller ones. The ruins of the town, on the slight elevation near these, are unimportant as guides to its history. It has been little visited by strangers, partly owing to its distance from other places of historical interest, and partly because of the insecurity of travel in that part

of the country. A wilderness, still known as the desert of Beer-sheba, stretches to the southward. The Scriptural passages in which Beer-sheba is mentioned are very numerous; and the position of the town in the extreme south of the country gave rise to the phrase "from Dan to Beer-sheba," as a means of designating the whole land of the Jews, Dan being on the N. border.

BEET, a plant of the genus *beta*, belonging to the natural order *chenopodeæ*, among which it is known by its large succulent roots and a green calyx united half way to a hard rugged nut. The species are found in Europe, the north of Africa, and the western parts of Asia. Four species of this genus are cultivated as esculents; the others are mere weeds. The common beet (*B. vulgaris*) is found in a wild state in Egypt and along the whole of the seacoast of the Mediterranean. There are several varieties, differing in the form, size, color, and sweetness of their roots. Those of a deep red color are called blood beets. The "small red" and

Long Blood Beet. Round Blood Beet.

the "long yellow" are the most sweet and delicate, and have the richest color when served at table. Beet roots can only be obtained in perfection in a rich, light, sandy soil, through which they can easily penetrate. In stony or stiff soils the roots become parched and lose their succulence. Mangel-wurzel (*B. altissima*) is a much larger and coarser plant than the common beet, from which it differs by its roots being marked internally with zones of red and pink or white. Its native country is unknown. It is extensively cultivated in Europe for feeding cattle; its leaves afford a very nutritious food for all kinds of live stock, and its roots, from their exceeding sweetness, are considered one of the most valuable plants on which cattle can be fed in winter. Swedish turnips, or *ruta baga*, exceed them in the quantity of nourishment, weight for weight; but on good light soils the produce of the beet per acre is much greater. The following proportional values are given by Einhof and Thaer: 18 tons of mangel-wurzel are equal to 15 tons of Swedish turnips, or 7½ tons of potatoes, or 3½ tons of good English hay, each quantity containing the same amount of nourishment; but the roots may be grown upon less than an acre of ground, while two or three acres of good grass land are required to produce the equivalent amount of hay. The beet root is also deemed the least exhausting to the land.—The white beet has been chiefly cultivated for the purpose of extracting sugar from its juice. It is smaller than the mangel-wurzel and more compact. The manufacture of sugar from beet root was first commenced in France in consequence of the emperor Napoleon's scheme for excluding British colonial produce. The process has since been much improved, and beet-root sugar now competes on nearly equal terms with colonial or cane sugar, in the markets of the world. Most of the operations in manufacturing beet-root sugar are nearly the same as those by which the juice of the sugar cane is prepared for use; but much greater skill and nicety are required in rendering the juice of the beet root crystallizable, owing to its greater rawness and the smaller relative proportion of sugar it contains. When beet-root sugar is refined, however, it is almost impossible to distinguish it from the other, either by the taste or the appearance. Five tons of clean roots produce about 4½ cwt. of coarse sugar, which gives about 160 lbs. of double-refined sugar and 60 lbs. of inferior lump sugar; the rest is molasses, from which spirits are distilled.—The chard beet (*B. cycla*), inferior in the size of its roots, is remarkable for the thickness of the ribs of its leaves, which are white, yellow, green, orange-colored, or deep crimson, in different varieties. It is cultivated like the common beet in gardens, and forms one of the principal vegetables used by agricultural laborers and small occupiers of land in many parts of Germany, Switzerland, and France. Swiss chard produces numerous large succulent leaves, with a

Chard Beet.

very solid rib running along the middle. The leafy part stripped off and boiled is used as a substitute for greens and spinach; the rib and stalk are dressed like asparagus or scorzenera.

They have a pleasant sweet taste, and are deemed by some persons more wholesome than the cabbage tribe; but in other varieties they have an earthy taste which is unpleasant.—Sea beet (*B. maritima*) is a perennial, and one of the most valuable plants known for greens. It thrives in gardens without any sort of care, and is increased by seeds, which it yields in great abundance.

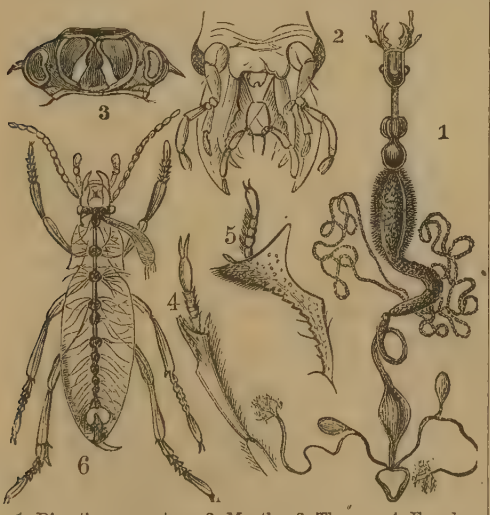
BEETHOVEN. **I. Ludwig van,** a musician, probably a native of Maestricht in Holland, died in Bonn, Dec. 24, 1773. He was a bass singer of considerable reputation in the electoral chapel at Bonn, and in opera. About 1761 he was made kapellmeister by the elector Maximilian Frederick, and seems to have held that office until the appointment of Lucchesi in 1771. He composed several operas, none of which are now preserved. **II. Ludwig van,** one of the greatest of musical composers, son of Johann van Beethoven, a tenor singer in the electoral chapel at Bonn, and grandson of the preceding, born in Bonn, Dec. 16 or 17, 1770, died in Vienna, March 26, 1827. Before he was 4 years old he was placed at the harpsichord, and forced unrelentingly to perform his daily task of exercises. He soon required better instruction than his father could give, and became successively the pupil of Pfeiffer, oboist in the chapel, and of Van der Eder, court organist. In 1781 Van der Eder was succeeded by C. G. Neefe, and the pupil was transferred to him. In a musical periodical of that day it is said that at the age of 11 years he played nearly all of Sebastian Bach's *Wohltemperirtes Klavier*, and that Neefe had caused nine variations by him upon a march to be engraved. Besides these variations, we possess a specimen of his powers at this early age in three pianoforte sonatas, dedicated to the elector and printed at Spire. Through the influence of Count Waldstein, Beethoven was in his 15th year appointed assistant court organist, and in his 18th was sent to Vienna at the elector's expense, to study with Mozart. The illness of his mother recalled him to Bonn, and her death about the end of July, 1787, doubtless was the cause of his remaining for the present there; for, owing to the habits of his father, the support of his two young brothers must in a great measure have devolved upon him. In 1792, his brothers being off his hands (Karl a music teacher, and Johann an apothecary's boy), Beethoven was again in a position to accept the elector's kindness, and returned to Vienna; which capital and its environs, save upon a single visit to Berlin, one or two to Prague, and his summer journeys for health to various watering places, he never again left. The young composer reached Vienna a few weeks before completing his 22d year, and, modestly suppressing all his previous attempts at composition, came before the public only as a pianoforte virtuoso. The first five years of his sojourn in Vienna were the happiest of the composer's life. He mingled in the best society, was the favorite of people of the first rank, and was placed at the head of his profession by the best judges. In the mean time he was making himself master of musical form, studying successively with Haydn and the renowned contrapuntist Albrechtsberger, kapellmeister at St. Stephen's. The somewhat dry but thorough course of study pursued under the latter may be followed by the musical student in the work known as "Beethoven's Studies," which is made up from the lessons, original and selected, given him by his teacher, and is often enriched by the shrewd, witty, and caustic remarks of the pupil. The first important works which he sent to the press were the three sonatas, op. 2, and the three trios, op. 1, but others followed with a rapidity truly astonishing. It is not possible to arrange the works of this master in the order of their composition, and to decide how many, of his earlier productions especially, belong to a given period. It is certain, however, that before the close of the century the list included many variations and songs, more than 20 sonatas for the pianoforte solo, three (probably more) sonatas for the pianoforte and violin, three for piano and violoncello, three trios for piano, violin, and violoncello, that in B♭ with clarinet, the quartet for piano and bowed instruments, the quintet for piano and wind instruments, the concertos in C and B♭ for piano and orchestra, five trios, six quartets, the quintet in E♭ for bowed instruments, the septet, the ballet "Men of Prometheus," and the 1st and 2d symphonies! But he was already suffering from a calamity which afterward greatly limited his productiveness, but which we may consider the cause of the profound depth of sentiment, feeling, and passion, which is the leading characteristic of the music of Beethoven. In a letter to his friend Dr. Wegeler, dated June 29, 1800, he says: "My hearing has been gradually becoming weaker for three years past." The original cause of this misfortune was a hemorrhoidal difficulty, and a consequent chronic weakness of the bowels, attended with violent colic. He describes the symptoms of his case and its treatment by physicians, and adds: "I may say that I feel myself stronger and better in consequence, only my ears—they are still ever ringing and singing day and night. I can truly say that I pass a wretched existence; for the last two years I have almost entirely shunned society, because it is impossible to tell people I am deaf!" Again: "In the theatre I am forced to lean up close to the orchestra to understand the actors. The higher tones of the voices and instruments, if I am at a little distance, I cannot hear, and it is remarkable that people do not notice it in conversation with me." In the summer of 1802 he had a dangerous attack of illness, and in the prospect of death wrote a remarkable paper, addressed to his brothers, in which he paints the sufferings which he had passed through in very powerful language. We quote a few lines: "Born of an ardent, sanguine

temperament, and peculiarly susceptible to the pleasures of society, yet at this early age I must withdraw from the world and lead a solitary life. When I at times have determined to rise superior to all this, oh, how cruelly have I been again cast down by proofs doubly painful of my defective hearing; and yet it has been utterly impossible for me to say to people, 'Speak louder, scream, for I am deaf!' Ah, how could I proclaim the weakness of a sense which I ought to possess in a higher degree than others, which once I did possess in the highest perfection—a perfection equalled by few of my profession? Alas, I cannot do this! Forgive me, then, if I draw back when I would gladly mingle with you. My misfortune inflicts upon me a double woe in causing me to be misapprehended. For me there can be no recreation in social intercourse, no joining in refined and intellectual conversation, no mutual outpourings of the heart with others." Again: "But what humiliation, when some one standing by me hears a distant flute, and I hear nothing, or listens to the song of the herdsman, and I hear no sound! Such incidents have brought me to the verge of despair; a little more, and I had put an end to my life. One thing only, art—this restrained me. I could not leave the world until that was accomplished which I felt was demanded of me." Upon his recovery from his illness, though he had little hope of ever recovering his hearing, he became more patient and cheerful, and again wrought out his musical inspirations with great industry. Among the numerous compositions of the few following years are several of his capital works. The "Heroic Symphony" was produced in 1804; "Fidelio" in 1805; the 4th, 5th, and 6th symphonies, and the mass in C, during the four following years. It is a common impression that the ill success of his opera "Fidelio" discouraged Beethoven ever after from attempting dramatic composition. His negotiations with various poets, Körner, Rellstab, Grillparzer, Bernard, for a libretto, even down to the close of life, and especially a formal written proposition dated in 1807, and still in existence, to the management of the imperial theatres for an engagement as regular composer, show how erroneous is the impression. What prevented the acceptance of Beethoven's proposition by the managers is not now known. The music to Kotzebue's, "Ruins of Athens" was first performed in 1812; the "Battle of Vitoria" and the 7th symphony in the autumn of 1813; the cantata, "The Glorious Moment," at the Vienna congress in 1814; and the 8th symphony was written as early as 1816. The labors of the summer of 1815 were principally devoted to the arrangement of the Scottish songs for George Thompson of Edinburgh. From this period the works of Beethoven followed each other in still less rapid succession, not only from the grandeur and extent of their designs, but from the effects produced upon him by a legal process, which claimed much of his attention and caused him the deepest anxiety. The last half dozen sonatas, those giants of pianoforte composition; the grand mass in D, a three years' labor; the overture in C, op. 115; the 9th symphony, with chorus, completed in 1824; and the last grand quartets, were the principal productions of his last 10 years. The legal process above mentioned was too important in its influence to be passed over without some notice. His brother Karl had been unfortunate in his marriage, and upon his death in 1815 had left his son to the special care and protection of the composer. The mother, although she soon became the kept mistress of a citizen of Vienna, refused to part with her son, and Beethoven was forced to bring the case before the courts. The will of the father was not sufficient ground by the laws of Austria for removing the child from his mother, nor for his legal adoption by his uncle. It became necessary for Beethoven to prove the bad character of his sister-in-law, and show that the moral welfare of the boy demanded his removal from her influence. This, to a man who in the corrupt society of Vienna had lived a blameless life, and who had his friends and acquaintances principally among princes and the nobility, was in the last degree mortifying. Its effect upon him was so great that nothing but the necessity of meeting the large expenses entailed upon him by the lawsuit, and by his adoption of the boy, induced him to meet the demands of his publishers. During three years not one of his great works was produced. The suit was originally brought in 1816, in the court in which the causes of the nobility were tried, and after two or three years, during which the boy was sometimes in possession of the mother and at others of the uncle, was decided in favor of the latter. The opposing counsel thereupon brought a technical objection to the proceedings, viz., that Beethoven was not of noble birth, and could not bring suit in this court; that *van* in Holland was not equivalent to *von* in Germany. The point was sustained, and the suit was transferred to the magistrates' court of the city, clearly the proper place, as Beethoven had been made a citizen of Vienna some years before, as a mark of honor. The former decision was here reversed, and Beethoven was obliged to bring a new action. It was not until some time in the year 1821 that he obtained full possession of the boy. In the mean time the nephew had fallen into habits of indolence, falsehood, and extravagance beyond the power of his uncle to restrain or control. Johann van Beethoven, the composer's younger brother, was mean, sordid, and vain, and married to a woman who brought her illegitimate daughter to his house, and not seldom received her own lovers there. For such a man Beethoven could have little fraternal affection. The nephew became all in all to him. Upon him he lavished all the rich affections of his great heart; no pains nor expense was spared on the young man's education; but

in vain. In August, 1826, the youth, then about 20 years of age, unable to pass the examinations of the school to which he belonged, filled up the measure of his ingratitude by shooting himself in the head. The wound was not fatal, and at length he recovered. By the laws of Austria he was an offender against public morals and the church, and for some months was deprived of liberty. When at length restored to his uncle, it was with the order to leave Vienna in 24 hours. In his extremity Beethoven accepted the invitation of his brother to retire with Karl to Johann's estate on the Danube, some 80 miles above Vienna, until such time as a place in the army could be found for the young man. The place and the society of his brother's family soon became insupportable to the composer, and he determined to return to the capital. This journey of two days, in cold, wet weather, was too much for his feeble constitution, and he reached Vienna, Dec. 2, 1826, with his nephew, laboring under the effects of a very severe cold. Violent inflammation of the lungs set in, succeeded by dropsy, under which he sank.—In the catalogue of Beethoven's works, we find hardly a branch of the art in which he had not wrought, but the preponderance of the instrumental over the vocal music is striking. For the full orchestra he has left us 9 symphonies, 11 overtures, the Egmont music, the "Battle of Vitoria," and some shorter pieces. Of chamber music the compositions—among them 16 grand quartets, and 4 trios for bowed instruments, from the grand concerto and septet down to the romanza and sonata—are very numerous. There are 32 grand sonatas for the pianoforte solos, and more than 100 other compositions, varying from the grand concerto to the variations upon a melody for that instrument alone or combined with others. Two masses, one sacred cantata, and a number of songs, belong to the branch of sacred music; an opera, and a vast variety of songs, trios, &c., fill up the catalogue of his vocal music. Beethoven's mission, if we may use the term, was to perfect instrumental music as the language of feeling and of the sentiments. Under Bach, Haydn, and Mozart, the sonata and the symphony had attained their complete development in form. Under Beethoven, a new soul was infused into them. Something had already been done in this direction. We perceive traces of it in Bach and in Mozart. Clementi had written a sonata for the pianoforte, entitled *Dido Abbandonata*, and Haydn, in quartet and symphony, was in the habit of imagining some story, the situations of which, in their corresponding emotions, he endeavored to depict. Beethoven went further. He not only painted character as no other master had done in music (see his overtures to "Prometheus" and "Coriolanus"), but made his music the medium of communicating the feelings which swelled his own breast. We feel this continually in his pianoforte sonatas, nor is the explanation of the fact difficult. The unremitting practice to which he was forced by his father during childhood, together with the course of instruction then in vogue, which aimed rather at making sound musicians than masters of finger gymnastics, gave him that power over the pianoforte and the organ without which no one can be said to have a mastery over those instruments. Beethoven's extemporaneous performances were as free from false harmonic relations as the speaking of an accomplished orator from errors in the use of articulate speech. Upon his arrival in Vienna men who had known Mozart and fully appreciated his marvellous powers, confessed their astonishment at the force, vigor, and fire of the young Rhinelander when, giving his fancy the rein, his flying fingers interpreted the current of his musical thoughts. In his earliest published works will be found much of that pensive feeling which distinguished his extemporaneous efforts, and this quality in his sonatas became more marked as he advanced in years. When writing for the orchestra the grandeur of his thoughts rose with the increase of means at his command, and he reached heights beyond all that composers before him or since have attained.—Justice has not usually been done to Beethoven on the score of intellect. His large head was in fact filled with a brain capable of intensely energetic and long-continued action. He was an insatiable reader, especially of history, and none followed with a deeper interest the rapidly changing scenes of that great political drama which began in his 19th year in Paris, and ended at the congress of Vienna in 1815. Born upon the Rhine, reared under the remarkably liberal institutions of the electorate of Cologne, and subjected to the direct influence of those ideas which set France in a blaze, he was early and for life a republican in his politics. In whatever sphere of mental activity Beethoven had been placed, he would have been a man of mark.—Great preparations had been made long in advance for the celebration of Beethoven's centenary anniversary throughout Germany in December, 1870; but owing to the Franco-German war then raging they were only partially carried out, and in Bonn the commemoration was held on a large scale in August, 1871.—There are a number of biographies of Beethoven, the earliest being that by his friend A. Schindler (*Biographie von Ludwig van Beethoven*, 2 vols. 8vo, Münster, 1838; 2d ed., 1860). On his deathbed the composer expressed a wish that his life should be written by Fr. Rochlitz, the author of the work *Für Freunde der Tonkunst;* but the state of Rochlitz's health prevented his undertaking the work, and it devolved upon Schindler, whose long and intimate acquaintance with Beethoven gave him many advantages for performing the task. Schindler's work was translated into English and edited by Moscheles. Among the other lives of Beethoven, the most voluminous is by Mr. Alex-

ander W. Thayer, an American, who has devoted many years of his life to the minute researches necessary to make an exhaustive biography of the composer. The work at the present date (1873) is unfinished, only one volume having been published, and that in German. The other principal sources of information upon this subject are as follows: Wegeler and Ries, *Biographische Notizen über L. v. Beethoven* (Coblentz, 1838); Dr. A. B. Marx, *Ludwig van Beethoven's Leben und Schaffen* (2 vols., Berlin, 1859; 2d ed., 1863); L. Nohl, *Beethoven's Leben* (2 vols., Vienna, 1864–'7); and *Ludwig van Beethoven's Biographie und Characteristik*, by Dr. Heinrich Döring, prefixed to the Wolfenbüttel edition of the composer's pianoforte sonatas.

BEETLE, a very numerous and well known order of insects, constituting the *coleoptera*. They have usually 4 wings: 2 membranous, the organs of flight, filmy and folded transversely; and 2, anterior and superior to these, of a harder consistence, protecting the former, and called *elytra*. They all have mandibles and jaws. The head varies greatly both in size and form in the different tribes; it presents 2 antennæ, of various forms, of which the joints are generally 11 in number; the eyes are 2, and compound; they have no simple eyes, according to Latreille. The mouth consists of a labrum; 2 mandibles, usually of a horny consistence; 2 jaws, each one having 1 or 2 palpi; and a labium of 2 pieces, accompanied by 2 palpi. The anterior segment of



1. Digestive apparatus. 2. Mouth. 3. Thorax. 4. Fore leg. 5. Hind leg. 6. Nervous system.

the thorax, or the corslet, which is in front of the wings, is larger than the other two segments, and is free in its movements; it supports only the first pair of legs; the other segments are united together, and nearly immovable; the mesothorax supports the second pair of legs and the elytra; the membranous wings and the third pair of legs are attached to the third and last segment. The elytra and wings originate from the lateral and upper portions of the segments. The former are of a firm consistence, almost crustaceous, and, in a state of rest, are applied horizontally one against the other along their internal edge; they almost always conceal the true wings, and are generally as long as the body; in the act of flight they are usually extended, though in some species destitute of true wings they are united on the dorsal suture; in the wingless genera the elytra are always found. The abdomen is sessile, or united to the chest by its greatest breadth, composed of 6 or 7 rings, membranous above, where it is protected by the elytra, and of a more horny consistence below. In the males the anterior pair of legs are often stronger, and the tarsi broader, than in the females. All the coleoptera masticate, and are accordingly provided with instruments proper for cutting and triturating their food; the salivary glands are quite rudimentary, and few in number; the digestive canal varies in length according to the habit of life, but it generally is much longer than the body. The sexes are separate, and the act of reproduction is a true sexual connection. The organs of respiration are stigmata along the sides of the body, and tracheæ pervading all parts of the system. The abdomen encloses a fatty tissue, apparently connected with nutrition, which causes many of these insects to be eagerly sought for as food by the savage tribes of the old world. They undergo a complete metamorphosis; and the larvæ or grubs are generally soft-bodied, and provided with 6 legs; it is in this state that they are so destructive to vegetation. The males perish soon after the sexual union, and the females die shortly after the eggs have been deposited.—The coleoptera have been variously divided by different authors; the divisions of Latreille, according to the number of the joints in the tarsi, have been generally adopted by naturalists. These divisions are the following: 1, *pentamera*, having 5 joints on each foot; 2, *heteromera*, having 5 joints to the anterior 2 pairs of feet, and 4 joints to the posterior pair; 3, *tetramera*, having 4 joints to all the feet; 4, *trimera*, having no more than 3 joints to the feet. Though this system is artificial, and in many points very defective, it is still sufficient to give a clear idea of this very complex order. Latreille makes 20 families. The *pentamera* include: 1. The *carnivora*, whose varied species all agree in being exceedingly voracious; they are both terrestrial and aquatic; the former have been divided into the tribes *cicindeletæ* and *carabici;* the latter constitute the tribe *hydrocanthari*. The *cicindelæ* are very beautifully ornamented, of light and active forms, quick in their motions, darting on their insect prey, which they devour alive; they prefer light and sandy districts exposed to the sun; they are extensively distributed over the

earth; the larvæ are of a forbidding appearance and extremely voracious, seizing any insect which passes the openings of their subterranean holes. All the *carabici*, in the grub and perfect state, feed on living prey; they emit a fetid liquid when pursued, and are for the most part agile runners; many have no true wings; they conceal themselves in the earth or under stones and the bark of trees.

Bombardier Beetle (Brachinus crepitans).

This is a very numerous tribe, and its study is difficult. Some of the most interesting genera are *carabus*, *scarites*, *harpalus*, *brachinus*, *feronia*, &c. Among the *carabidæ* or ground beetles, many of which eject a fetid fluid for defensive purposes, may be mentioned the bombardier beetle (*brachinus*), of which there are several species in both hemispheres, varying in length from one eighth to half an inch. The wing covers and lower part of abdomen are bluish black; the rest of the insect, including the long and narrow head and thorax, legs, and antennæ, reddish. The species of *brachinus*, and of the allied genus *aptinus*, have received the above name from their habit of projecting from the anus, with an explosive puff, a fine acid spray, to the distance of several inches, so irritating to the eyes and abraded skin as to cause severe smarting, and discoloring the cuticle as if by an acid; the fluid is very volatile, and of a pungent odor. They are carnivorous in all their stages, and not injurious to vegetation. The larger tropical species are the most brilliant. The *hydrocanthari*, or swimming beetles, include the genera *dytiscus* and *gyrinus;* the feet are adapted for swimming, being compressed and ciliated; they live in the fresh lakes and marshes and quiet streams of all countries, and they pass their first and final stages in the water. The *dytisci* can live on the land and also can fly; they vary in size from 1½ inch to ¼ of an inch in length; they are carnivorous and voracious, and can remain a long time under water in pursuit of their prey; they swim on the surface with great rapidity. The *gyrini* are smaller, and may be found in troops on the surface of still waters, darting about with surprising agility; they can see in the water and in the air at the same time; they can fly well, though they swim better; the eggs are deposited on the leaves of aquatic plants. This family is useful in destroying noxious and predaceous insects and grubs. 2. The *brachelytra* have but one palpus in the jaws, or four in all; the wing cases are shorter than the body, which is narrow and elongated; the head is large and flat, the mandibles strong, the antennæ short; they live in moist earth, on dung and other excrementitious matters, and most of all in decaying animal carcasses; they are courageous and strong, running or flying with the greatest facility; they destroy insects with eagerness. This family is composed entirely of the old and vaguely determined Linnæan genus *staphylinus*. The larvæ live in the same situations as the perfect insects. The family are very useful natural scavengers. 3. The *serricornes* have elytra covering the abdomen, and antennæ equal throughout, dentated, saw-like or fan-like. Among the most interesting genera is *buprestis*, many of whose species are very large and exceedingly brilliant; these walk very slowly, but are excellent flyers; they are most numerous in warm climates, and live generally in wood. The genus *elater* is remarkable for the shortness of the legs, and for the faculty it has of changing from a supine position to its feet by springing into the air by means of a spine on its præsternum; the species are found in flowers or plants, and on the ground; some of the American species, as the *E. noctilucus*, are phosphorescent, and are called fireflies. The genus *lampyris* also is interesting, as containing the phosphorescent species whose females go by the name of glow-worms. The genus *telephorus* is noted as furnishing the species which are occasionally taken up by high winds, and deposited in distant regions, causing the so-called insect showers. The tick of the death-watch is produced by a species of *anobium*, living in decaying wood. The larvæ sometimes cause great destruction of valuable timber. 4. The *clavicornes* have the antennæ thickened or knob-shaped at the end; they live chiefly on animal substances. The genus *hister* feeds on decaying and excrementitious matters. The genus *necrophorus* is noted for its habit of interring small animals, such as mice and moles, for the purpose of depositing its eggs in the decaying carcass; this they do by removing the earth beneath the body, which falls into the hollow; their sense of smell must be extremely acute. The genus *silpha* also prefers putrefying animal substances. The genera *dermestes* and *anthrenus*, in their larva state, are perfect pests to the naturalist, as they devour every animal substance accessible in his cabinet; the action of heat, usually employed to destroy them, is nearly as destructive as the insects. 5. The *palpicornes* resemble the preceding family in the shape of the antennæ, composed of only nine joints, and the feet in most of the genera are formed for swimming. The genus *hydrophilus* is carnivorous and voracious, frequenting fresh water and marshes, swimming well, but not so rapidly as *dytiscus;* their larvæ destroy

great numbers of aquatic insects and water snails; they pass the nymph state in cavities in the earth, for about three weeks. Other genera are *elophorus* and *sphæridium;* the latter is terrestrial. 6. The *lamellicornes* are the last family of the *pentamera*, including numerous genera, among which are some of the most brilliant and the largest of the order; those that feed on vegetable substances are beautifully colored, while dark tints prevail among those which devour decaying animal matters. The antennæ are deeply inserted under the side of the head, short, ending in a knob, composed of plates or laminæ. An idea of the form of the larvæ, which are often very destructive to vegetation, may be formed from the well known white worm, the larva of the *melolonthâ.* In this family is included the genus *scarabæus* of Linnæus, proper to warm

Scarabæus enema.

climates, particularly Africa; they live in ordure of all kinds; the *eutachus sacer*, an object of religious veneration among the ancient Egyptians, and often represented on their monuments, and found in the sarcophagi, belongs to this genus. Other genera are *copris*, *geotrupes*, *trox*, *melolontha*, *cetonia*, and *lucanus* (stag beetle). While many of the melolonthians are

Stag Beetle.

destructive, the *geotrupidæ* and *scarabæidæ* are useful in removing carrion and filth.—The *heteromera*, the second section of the order, are all vegetable feeders; many of them avoid the light. It includes: 7. The family *melasoma*, of black or ash-colored species, for the most part apterous, with the elytra as it were soldered together; some of them have a salivary apparatus; they dwell on the ground, under stones, and in dark situations in houses, quitting their retreats at night; they are slow in their movements. Among the genera are *pimelia*, *blaps*, and *tenebrio* (meal worms). They and their larvæ are useful scavengers. 8. The *taxicornes* have no corneous tooth on the inner side of the jaws; all are winged, and the legs are not adapted for running; in the males the head is sometimes furnished with horns. Most live on tree fungi or under the bark, or under stones on the ground. Some of the genera are *diaperis*, *phaleria*, and *eledona.* These fungus-eaters are useful to man. 9. The *stenelytra* differ from the preceding chiefly in the antennæ; they are very active, concealing themselves under the bark or among the leaves and flowers of trees; some live in fungi, others in old wood. To this belong the genera *helops*, *cistela*, *dircæa*, *ædemera*, and others serviceable to man. 10. The *trachelides* live on plants, of which they devour the leaves and suck the juices. Here belong the genera *lagria*, *pyrochroa*, *mordella*, *notoxus*, *horia*, *meloe*, *cantharis*, &c.; the *C. vesicatoria*, or Spanish fly, is well known in medicine for its blistering properties.—The third section, the *tetramera*, are vegetable feeders. It includes: 11. The *rhynchophora*, a large and richly ornamented family, living very often in the interior of fruit and seeds, and very destructive to the products of the farm and the orchard; it is easily recognized by its projecting muzzle. Among the genera are *bruchus*, whose larvæ are very destructive; *attelabus; brentus; curculio*, the greatest pest of the horticulturist; *calandra*, one of whose species, the weevil, destroys immense quantities of grain; the larvæ of the *C. palmarum* are considered a great dainty by the West Indian blacks. 12. The *xylophagi*, in the larva state, destroy or render useless great numbers of forest trees by the channels which they gnaw in various directions. Among the most destructive is the genus *scolytus;* other genera are *bostrichus* and *trogosita.* 13. The *platysoma* are found beneath the bark of trees. The principal genus is *cucujus.* 14. The *longicornes* have filiform and very long antennæ; their larvæ live in the interior or beneath the bark of trees, where they are very destructive. Some of the species are among the largest of the order. Among the genera are *parandra*, *cerambyx*, *callidium*, *lamia*, *saperda*, and *leptura.* 15. The *eupoda* derive their name from the large size of the posterior thighs in many species; they are all winged, and occur on the stems and leaves of plants, especially the *liliaceæ.* Among the genera are *sagra*, *crioceris*, and *donacia.* 16. The *cyclica* are small, slow in their movements, but often brilliantly colored; the females are very prolific. Here are placed the genera *hispa*, *cassida*, *cryptocephalus*, *chrysomela;*

eumolpus, one species of which, *E. vitis*, in its larva state, commits great ravages in wine countries; *galeruca* and *altica*, possessed of great jumping powers; the latter is often very destructive to turnip crops. 17. The *clavipalpi* are all gnawers, and may be distinguished by their antennæ ending in a knob, and by an internal tooth to the jaws; the body is usually rounded. Some of the genera are *erotylus*, *triplax*, *agathidium*, and *phalacrus*.—The last section, the *trimera*, have the antennæ ending in a compressed club formed by the last 3 of the 11 joints; it contains: 18. The *fungicolæ*, living chiefly in fungi and dead wood. The principal genus is *eumorphus*. 19. The *aphidiphagi* are best represented by the genus *coccinella*, or lady-bird; these pretty little beetles, more especially in the larva state, live almost entirely on aphides, or plant-lice, and in this way are of immense service. 20. The *pselaphii* have short truncated elytra; the species are generally very small, and live on the ground in moist places, and under stones and moss. The types of this, the last family, are the genera *pselaphus* and *claviger*.—The coleoptera are exceedingly numerous in species. It is by the occurrence of elytra that this order may be at once recognized; these organs are highly ornamented, and they serve not only to protect the membranous wings, but to shield the body in the dark and dangerous places in which beetles delight to go; and by their expanded surfaces they assist the heavy species in their flight, acting both as a sail and a parachute.

BEFANA, in Italy, a puppet or doll dressed as a woman, and carried through the streets in procession on the day of Epiphany, and on some other feast days. The name is probably derived from *Epifania*, the feast of the Epiphany. On the day of this feast presents are given to children in Italy, as they are elsewhere on Christmas or New Year's, and the *befana* is supposed to bring them.

BEG, Bey, and **Beglerbeg,** titles of honor among the Turks. Beg means lord or commander; the beglerbeg is "the lord of the lords." The sons of a pasha bear this title, and in the army an officer on being promoted to the rank of colonel obtains the title of bey. In the African provinces, the bey is the supreme officer of Tunis and Tripoli.

BEGAS, Karl, a Prussian painter, born at Heinsberg, near Aix-la-Chapelle, Sept. 30, 1794, died in Berlin, Nov. 24, 1854. He studied first under Philippart, and in Paris under Gros. One of his early works, a copy of the Madonna della Sedia, attracted the attention of the king of Prussia, who appointed him painter to the Prussian court. His productions comprise historical, genre, and portrait paintings, of which the most important are "Henry IV. at the Castle of Canossa," the "Sermon on the Mount," "Christ on the Mount of Olives," the *Lorelei*, and the portraits of Humboldt, Schelling, Ritter, Rauch, Cornelius, and Meyerbeer.

BEGHARDS. I. The popular appellation of a body of religious penitents of the third order of St. Francis of the congregation of Zepperen. They were founded at the convent of Zepperen in the diocese of Liége prior to 1323, and several other houses soon grew up. They were almost all lay brothers, living in community, and carrying on some trade, as weaving, spectacle-making, &c. Having few priests in the order, they were at first all governed by a superior general, who was a secular priest till Pope Nicholas V. directed that he should always be a Franciscan. These Franciscan tertiaries incorporated into their body a community founded at Antwerp in 1228 and called Beghards, a name of uncertain derivation. The Franciscan rule and habit were adopted, and the name Beghards was given to the whole body. Difficulties having arisen between the priests and lay brothers, they separated for a time, but were finally reunited under one general. In 1651 the whole body was incorporated by Innocent X. with the congregation of Lombardy. There were similar houses in other parts of the Low Countries, some of which also took the name of Beghards. **II.** A set of fanatics, also called Spiritualists, who arose in the 13th century in the Low Countries, and assumed the dress and name of the Franciscan tertiaries, but refused to obey any ecclesiastical authority. A number of enthusiasts of both sexes joined them, and adopting the reveries of Abbot Joachim, they spread in France, Germany, and Italy, creating great disturbances. They were also called Beguins and Beguines. They were condemned in 1300 by Pope Boniface VIII., and by Clement V. in the council of Vienne.

BEGHARMI. See Baghirmi.

BEGONIA, a genus of plants indigenous to

Begonia.

the East and West Indies and South America, closely allied to the *cucurbitaceæ* according to

Lindley. Their curiously one-sided leaves, and the brilliant colors these often exhibit, make the various species much sought by florists. *B. rex* has been varied until the leaves not only attain great size, but are beautifully banded. Other species are remarkable for the brilliant red of the under surface of the leaves, or the abundance and grace and color of their flowers. They are easily propagated under glass on the cutting bench by planting the end of the succulent petiole with a small disk of the leaf attached, the new stem springing from this unusual place.

BEGSHEHER, Begshehr, or Beysheher, a lake, river, and town in Karaman, Asia Minor. The lake, which is 20 m. long and from 5 to 10 m. broad, is supposed to be the ancient Carallis or Caralitis in Isauria. It contains a number of islands. The river is the outlet of the lake, and flows S. E. about 25 m. into Lake Soghla. On the banks of this river, near the S. E. end of the lake, stands the town of the same name, 43 m. W. S. W. of Konieh. It is built on both sides of the stream, the opposite quarters being connected by a stone bridge of seven arches. It was formerly the capital of a sanjak.

BEGUARDS. See BEGUINES.

BEGUINES, a sisterhood in the Roman Catholic church peculiar to Belgium and Holland. Their name is ascribed by some to Saint Beghe, by others to their founder Lambert, surnamed le Bègue or the Stammerer, who died in 1177. These Beguines were associated at first in communities, with or without vows, but agreeing to live in chastity and penance. They now make simple vows before the parish priest to live in obedience and chastity as long as they remain in the beguinage. Their habit is black. The beguinages comprise several houses within the same enclosure, with a church, frequently in the centre, each house having its own prioress. (See BEGHARDS).

BEHAIM, or Behem, Martin, a German navigator and geographer, born in Nuremberg about 1459, died in Lisbon, July 29, 1506. He went in 1477 to Flanders, where he engaged in manufacturing and selling cloth at Mechlin and at Antwerp. The active commerce between Flanders and Portugal, and the interest which he took in the great maritime undertakings of the Portuguese, induced him in 1480 to visit Lisbon, where he was well received at the court of John II., and became a pupil of the learned Johann Müller, celebrated under the name of Regiomontanus. Here he was associated with Columbus, whose views of a western passage to India he is said by Herrera to have supported. In 1483 he was appointed a member of the commission for calculating an astrolabe and tables of declension; and in reward for his services he was made a knight of the order of Christ. In the following year he was cosmographer in the expedition of Diogo Cam, who sailed along the W. coast of Africa as far S. as the mouth of the Congo. In 1486 he sailed to Fayal, one of the Azores, where he established a Flemish colony, and married the daughter of its governor. Here he remained till 1490, when he returned to Nuremberg, where he constructed a terrestrial globe, still preserved there, on which historical notices were written, and which is a valuable memorial of the discoveries and geographical knowledge of his time. Behaim subsequently returned to Fayal, and was for a time employed in diplomacy by the Portuguese government. It has been maintained by some writers that he visited America before Columbus; and an island which he places upon his globe far to the west of the Azores has been thought to be evidence of this. But the existence of an island somewhere in the western waters was one of the current beliefs of the time, and it is probable that Behaim had no positive evidence in assigning it a locality.

BEHAM, Hans Sebald, a German painter and engraver, born in Nuremberg about 1500, died in Frankfort in 1550. He was at first a pupil of his uncle Barthel Beham, and afterward of Albert Dürer. Bartsch enumerates 430 of his prints, of which 171 are woodcuts. He excelled principally as an engraver upon copper, and in small prints, which are much in the style of those of Aldegrever. He was notorious for profligacy, on account of which he was thrown into the Main and drowned.

BEHEMOTH, a beast described in the book of Job (xl. 15–24). There has been much variety of opinion as to what species of animal is referred to under this appellation. The elephant and the crocodile have been suggested. Dr. Adam Clarke believed it to be the mastodon. Bochart maintained that it was the hippopotamus, and his opinion has been adopted by most recent commentators. The Christian fathers variously supposed it to be a figurative representation of the devil, Antichrist, Sennacherib, and Pharaoh. According to Talmudical fancies, the behemoth is one of two marvellous ox-like animals, male and female, created by God at the beginning of the world. The female has long been slain, and the flesh is preserved for a banquet to the faithful Israelites on the morn of the resurrection. The male still lives, and eats daily the foliage of 1,000 mountains, which grows again by night. He, too, will be slain to furnish a feast to the Messiah at his appearance.

BEHISTUN, Bisutun, or Baghistan, a ruined town of Persia, in the province of Irak-Ajemi, in lat. 34° 18′ N., lon. 47° 30′ E., 17 m. E. of Kermanshah. It is noted for a precipitous rock, anciently known as Mount Bagistanus, which on one side rises perpendicularly to the height of 1,700 ft. Diodorus relates that Semiramis encamped near this rock, and caused the lower part to be smoothed away and an inscription engraved upon it in her honor. No trace of any such inscription now exists; but the rock contains cuneiform inscriptions engraved upon it by the Persian king Darius Hystaspis, about 516 B. C. The principal in-

scription is in three languages, Persian, Babylonian, and Scythic; its interpretation has been accomplished by Sir Henry Rawlinson. It is on the face of the rock, at an elevation of 300 ft. from the ground. Great labor was required to fit the rock for the purpose. Where the stone was defective pieces were let in and fastened with molten lead; so carefully was this done that the inserted pieces can now be detected only by careful scrutiny. After the inscriptions had been engraved, a silicious coating was applied to preserve them from the action of the elements. This coating is harder than the rock itself. In places where it has been washed away, it lies in flakes at the foot of the precipice. In other places, where the rock has been honeycombed beneath, the varnish still adheres to the broken surface, and preserves with distinctness the forms of the characters. The Persian copy is contained in five main columns, four of which have each from 92 to 96 lines, the fifth 35 lines. It sets forth the hereditary right of Darius to the throne, tracing his genealogy for eight generations; recounts the provinces of his empire; and tells how he triumphed over various rebels who uprose against him during the first four years of his reign. The monarch himself is pictorially represented, armed with a bow, his foot upon the prostrate figure of a man, while nine rebels chained together by the neck stand humbly before him. The Behistun inscription is one of the most notable works of the kind. (See CUNEIFORM INSCRIPTIONS.)

BEHN, Aphara, or **Aphra,** an English dramatist and novelist, born in Canterbury about 1640, died in London, April 16, 1689. She was very young when she sailed with her father, whose name was Johnson, for Surinam, of which he was appointed lieutenant general. Her father died on the passage, but she resided for some time in Surinam, and became intimately acquainted with the native prince Oroonoko, whose adventures and fate were the theme of one of her own novels, and of a tragedy by her friend Southern. Soon after her return to England she married Mr. Behn, a London merchant of Dutch extraction, and was introduced to Charles II., whom she delighted by her vivacity. This monarch selected her as a political spy on the continent during the Dutch war. She took up her residence at Antwerp, and attracted numerous lovers and admirers, whom she managed so well that in 1666 she detected the project formed by Admirals De Witt and De Ruyter of burning the English ships in the Thames. She at once transmitted the intelligence to England, but the court refused to believe her, though her report was speedily proved true by the event. Mortified at this, she renounced politics. Embarking soon after for England, she narrowly escaped death, being saved in a boat after the vessel had foundered. From this time she devoted herself to authorship and to the gayest society of the capital. Among her acquaintances were Rochester, Etheridge, Southern, Crisp, and Dryden. Her works comprise 17 plays, "Oroonoko, the American Prince," and other novels, a variety of short poems, and numerous letters, of which those between a "Nobleman and his Sister-in-Law" (Lady Henrietta Berkeley and Lord Grey) were the most famous. These productions are remarkable for their grace and sprightliness, their lack of moral principle, and their entirely unbounded license. She wrote under the signature of "Astræa," and Pope alludes to her by that name. She was buried in Westminster abbey. A fac-simile reprint of the edition of "The Plays, Histories, and Novels of the ingenious Mrs. Aphra Behn" of 1724–'35 (6 vols. 12mo) appeared in London in 1871.

BEHRING, or **Bering, Vitus,** a navigator in the Russian service, born at Horsens, Denmark, in 1680, died Dec. 8, 1741. He entered the Russian naval service in 1704, was made captain by Peter the Great, served with distinction in the war between Russia and Sweden, and in 1725 was placed in command of an expedition of discovery in the arctic seas. Returning from this, he was in 1728 placed in command of another expedition to the seas bordering upon N. E. Siberia. The explorations connected with the expedition lasted several years, in the course of which he discovered that the continents of Asia and America were separated by the narrow strait which bears his name. On June 4, 1741, he again set sail from Okhotsk, in command of two vessels. He sailed apparently as far as lat. 69° N., but stormy weather and sickness in his crews compelled him to return. He was wrecked on a desolate island in lat. 55° 22′ N., lon. 166° E., where he died. This island, and the sea in which it lies, still bear his name. He founded the Russian settlement of Petropavlovsk in Kamtchatka.

BEHRING ISLAND, an island off the E. coast of the peninsula of Kamtchatka, in lat. 55° 17′ N., lon. 165° 46′ E., about 90 m. long. It was uninhabited at the time of its discovery by Behring in 1741, but has since been occupied by fur-traders, and is a winter harbor for trading vessels. The island is destitute of wood, and the soil is exceedingly barren. It abounds in springs of fresh water, and the furs of the arctic animals found here are very valuable, the principal being the ice fox and sea otter.

BEHRING SEA, that part of the Pacific ocean which lies immediately S. of Behring strait, and between the continents of America and Asia. Its southern limit is the curvilinear line of the Aleutian islands, which, together with Behring island, stretch across the Pacific from Alaska to Kamtchatka. It receives the Anadyr river in a gulf of the same name on the Asiatic side, and the Yukon from the American, has several islands, and is almost perpetually covered with fog. The current sets north through the strait. The sea is not so much obstructed with ice as Baffin bay. It was first explored by Behring in 1728.

BEHRING STRAIT, a channel connecting the North Pacific and Arctic oceans between the continents of Asia and America, discovered by Behring in 1728. Between East cape in Asia and Cape Prince of Wales on the American side, the strait is only 36 m. wide. The depth of water is from 20 to 30 fathoms. It is commonly reckoned about 400 m. long. Capt. Cook visited and described the strait in 1778, and later Capt. Beechey. About midway across, in the narrowest place, are three islands, called Diomedes. Opposite the southern opening of the strait stands the large island of St. Lawrence. A current sets through the strait from S. to N. The adjacent coasts are uninhabited. The shores are bold and deeply indented. The strait is frozen over every winter, and large quantities of ice are constantly blocked in north of the capes.

BEIRA, or **Beyra,** one of the six former provinces of Portugal, bounded N. by Minho and Tras-os-Montes, E. by Spain, S. by Estremadura and Alemtejo, and W. by the Atlantic; area, 9,244 sq. m.; pop. in 1868, 1,288,994. The surface is very mountainous; the soil is not fertile, but produces barley, wine, wheat, maize, olives, and fruits. The mountains, including the Sierra de Estrella, furnish fine pasturage for sheep, and yield iron, marble, and coal. The principal rivers are the Douro, which forms the northern boundary, the Mondego, which flows through the centre, and the Tagus, on the S. E. border. The province was in 1838 divided into Upper Beira, capital Viseu, and Lower Beira, capital Castello Branco. It is now divided into the administrative districts of Coimbra, Castello Branco, Aveiro, Viseu, and Guarda.

BEIRUT. See Beyrout.

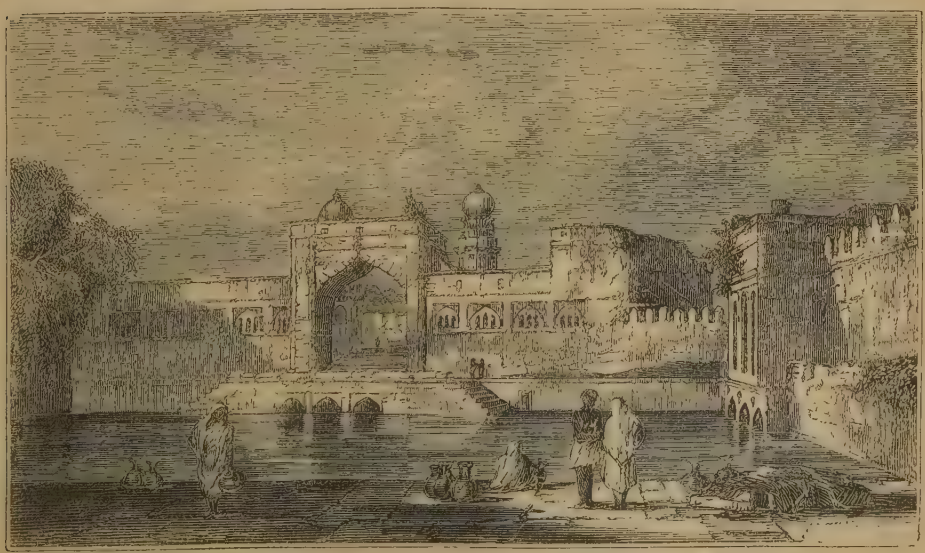
BEISAN. See Scythopolis.

BEISSEL, Johann Conrad, a German religionist, born at Eberbach in the Palatinate in 1690, died at Ephrata, Lancaster co., Penn., in 1768. He studied theology at Halle, but having joined the Dunkers was obliged to leave Germany, and in 1720 went to Pennsylvania, where he eventually established the new sect of the Seventh-Day Dunkers, or the German Seventh-Day Baptists, and founded a monastic establishment at Ephrata, over which he presided about 30 years. He published hymn books in German and Latin (1766–'73), besides his 99 mystical oracles.

BEIT-EL-FAKIH (house of the saint), a town of Arabia, 40 m. N. N. E. of Hodeida on the Red sea, and 85 m. N. of Mocha; pop. about 8,000. It contains a mosque and a strong citadel. The houses are built of brick and clay, and roofed with date leaves. Caravans from all parts of Arabia, Syria, Persia, and Egypt resort hither with Indian and British goods, spices and sugar, receiving in exchange, coffee, wax, and various gums. Much of the commercial importance of the place is owing to an annual festival of three days which is held at the tomb of a sheik near by. Another town of the same name, surnamed el-Kebir (the Great), is N. E. of Hodeida.

BEJA, a city of Portugal, capital of a district in the southern part of the province of Alemtejo, 36 m. S. S. W. of Evora; pop. 7,000. It is built on a hill, in the midst of a fertile plain, and is surrounded by a wall, having 40 towers. It has a castle and a cathedral. Earthenware is manufactured, and there are several tanneries in the town.

BEJAPOOR, or **Viziapoor,** a ruined city of Hindostan, in the province of Sattara, presidency of Bombay, formerly capital of a province of the same name, in lat. 16° 48′ N., lon. 75° 46′



Bejapoor.

E., 126 m. S. E. of the city of Sattara. It was once of great size, strongly fortified with outworks of great extent, and, according to the tradition of the natives, was the largest city of the East. The modern city retains few traces of its former grandeur. There is a street 3 m. long, several magnificent Saracenic edifices built in the 16th and 17th centuries, and a Brahman temple of unknown antiquity. This last is a remarkable structure, consisting of a rudely built roof of stone, supported by pillars each of which is a monolith. Another noteworthy edifice, partly in ruins, is the mosque and mausoleum of Ibrahim Adil Shah. The building is 400 ft. in length and 150 in width, and is surmounted by a dome of immense size. —The city and the province of which it was the capital were brought by native wars successively under the dominion of the Bahmenee empire (till 1489), of Adil Shah and his successors (till 1689), of Aurungzebee until his death, of the Mahrattas, and finally of the British, who in 1818 expelled the native ruler, and added Bejapoor to the territory assigned under their protection to the rajah of Sattara.

BEKE, Charles Tilstone, an English geographer and explorer in Africa, born in London, Oct. 10, 1800. He received a commercial education, then studied law, and afterward engaged in mercantile pursuits, residing for several years in the island of Mauritius. In 1836–'8 he resided at Leipsic, acting as British consul for Saxony. Considering Abyssinia of great importance in connection with the commerce of central Africa, he set out in 1840 on a journey of discovery in that region. In 1861, in company with his wife, he made a journey in Syria, in the course of which he identified Harran, near Damascus, as the residence of the patriarch Abraham. In 1865 Mr. and Mrs. Beke left England on a fruitless mission to effect the release of the Abyssinian captives. In 1870 he received a pension of £100 in consideration of his geographical researches, and especially of the value of his explorations in Abyssinia. Among his works are: "Origines Biblicæ, or Researches in Primeval History" (1834), for which the university of Tübingen conferred upon him the degree of Ph. D.; "Statement of Facts" relating to his journey to Abyssinia (1845); "Essay on the Nile and its Tributaries" (1847); "The Sources of the Nile in the Mountains of the Moon" (1848); "Geographical Distribution of Languages in Abyssinia" (1849); "Sources of the Nile, with the History of Nilotic Discovery," in which are incorporated the results of his previous labors (1860); "Jacob's Flight, or a Pilgrimage to Harran," written in conjunction with his wife (1865); and "The British Captives in Abyssinia" (1867).

BÉKÉS. I. A county of S. E. Hungary, watered by the Körös, an affluent of the Theiss; area, 1,320 sq. m.; pop. in 1870, 209,729, of whom about two thirds are Magyars, upward of one fourth Slavs, and the rest chiefly Germans and Roumans. The county is exceedingly fertile, but exposed to inundations. Agriculture and the raising of cattle, horses, and sheep are the main occupations. The *pusztas* and studs of Békés are renowned. Capital, Gyula. **II.** A town of the preceding county, situated at the confluence of the White and Black Körös, 33 m. S. W. of Grosswardein; pop. in 1870, 22,547. It has a considerable grain trade. It was formerly strongly fortified.

BEKKER, Immanuel, a German philologist, born in Berlin, May 21, 1785, died there, June 7, 1871. He studied at Halle under F. A. Wolf, and afterward in the royal library at Paris (1810–'12), having in the interval been appointed professor of philology in the newly founded university of Berlin. In 1815 he was sent to Paris by the Berlin academy of sciences to collate the papers of Fourmont for the *Corpus Inscriptionum Græcarum.* In 1817 the academy sent him to Italy, in conjunction with Göschen, to edit the Institutes of Gaius, the manuscript of which had been discovered at Verona by Niebuhr, and to prepare an edition of Aristotle. He passed three summers in Milan, Venice, Florence, Ravenna, and Naples, and three winters in Rome. In 1819 he went again to Paris, and in the year following to Oxford, Cambridge, and London, and thence to Leyden and Heidelberg. He now resumed his duties as professor in the university of Berlin, and continued his labors in philology, especially in the Greek language. He published editions, with extensive critical notes, of the *Anecdota Græca,* Plato, Theognis, Thucydides, the Athenian orators, Photius, Aristophanes, the scholia upon the Iliad, Aristotle, Harpocration and Mœris, and Pollux, the whole comprising 42 volumes. He also furnished accurate texts of Apollodorus, Appian, Dio Cassius, Diodorus, Heliodorus, Herodian, Herodotus, Homer, Josephus, Lucian, Pausanias, Plutarch's Parallels, Polybius, Suidas, Livy, and Tacitus. His part in the *Corpus Scriptorum Historiæ Byzantinæ,* published at Bonn, fills 24 volumes. In addition to these strictly classical labors, he busied himself with the remains of the Provençal romancers and song-writers, the results of his investigations appearing mainly in the periodicals of the Berlin academy. In the *Homerische Blätter* (Bonn, 1863) he published German notes upon Homer. Reminiscences of Bekker by his son were published in the *Preussiche Jahrbücher* for May, 1872.

BEL, or **Bil.** See Belus.

BÉLA, the name of several Hungarian kings of the lineage of Árpád.—**Béla I.** reigned from 1061 to 1063. As prince he was twice obliged to escape to Poland, on account of domestic dissensions occasioned by his brothers; but in 1061, supported partly by Poles, partly by Magyars, he succeeded in seizing the throne. He subdued the remains of paganism and strengthened the royal power, but his reign was too short to carry out all the reforms which Magyar annalists ascribe to him.—**Béla II.** reigned from 1131 to 1141. In his youth

he was blinded by his own uncle, for which he took terrible revenge on a number of his enemies when king.—**Béla III.** reigned from 1173 to 1196. He warred successfully against the Poles, Austrians, and Venetians, and reconquered from the last named some cities in Dalmatia. He was married to a sister of Philip Augustus, king of France.—**Béla IV.** reigned from 1235 to 1270. He was son of Andrew II., was crowned in childhood, and when his father went to Palestine received the title of *rex junior*, and finally joined in the opposition of the nobility against him. The greater part of his reign was stormy; the nobility continued in its turbulence, and Hungary was dreadfully devastated by the invasion of the Mongols (1241), before whom he had to fly to Dalmatia. (See HUNGARY.)

BELBEIS, Belbeys, or **Belbes,** a town of Lower Egypt, capital of a district of the same name, 28 m. N. N. E. of Cairo; pop. about 5,500. About 14 m. N. N. W. is the site of Bubastus, where traces of the Pelusian arm of the Nile are still visible, which probably led Bishop William of Tyre erroneously to identify Belbeis with Pelusium. North of the town are the ruins of the city of Patumus, supposed to be the Pithour in the building of which the Israelites were employed by their Egyptian taskmasters. The crusaders destroyed Belbeis, which was subsequently rebuilt and became an important station on the caravan road to Syria. It has not retained its prosperity. Napoleon I. had the fortifications repaired in 1798, but they have since fallen to decay.

BELCHER, Sir **Edward,** a British naval officer and explorer, grandson of Chief Justice Belcher of Nova Scotia, born in 1799. He entered the navy at an early age, and, after having taken part as midshipman in the defence of Gaeta and the battle of Algiers, was in 1819 appointed to the Myrmidon sloop, destined for the African station. In 1825 he became assistant surveyor to the Behring strait discovery expedition under Capt. Beechey in the Blossom. In 1829 he was promoted to the rank of commander, and served on the coasts of Africa and of Portugal, rendering on the latter occasion valuable services to the British residents by protecting their property during the political troubles in Portugal. Subsequently he explored the Pacific in the surveying vessel Sulphur, passed over to the Chinese waters in 1841, materially assisting in the operations of the British army near Canton, and in acknowledgment of these services was knighted and appointed post captain. He published an account of this voyage in his "Narrative of a Voyage Round the World" (1843). Afterward he was employed on board of the Samarang on surveying service in the East Indies, and was severely wounded while assisting the rajah of Sarawak, Sir James Brooke, in his efforts to subdue the pirates of Borneo. In 1852 he was sent in search of Sir John Franklin with five vessels, and made some important explorations in the neighborhood of Melville island. He rescued McClure and his crew, who had been three years imprisoned in the ice, but was obliged to abandon four of his own vessels, and reached home in 1854. On his return to England, he was tried before a court martial for voluntarily abandoning the ships. He was acquitted, and his sword returned to him; but while some of the other officers were commended, his name was passed over in significant silence. He is now (1873) a vice admiral. Besides his popular "Narrative," he has written "The Last of the Arctic Voyages" (2 vols., 1855).

BELCHER. I. Jonathan, governor of Massachusetts and New Jersey, born at Cambridge, Mass., in January, 1681, died at Elizabethtown, N. J., Aug. 31, 1757. He graduated at Harvard college in 1699, visited Europe, and made acquaintance with the princess Sophia and her son, afterward George I., and subsequently became a merchant in Boston. He was chosen a member of the council, and in 1729 went as agent of the colony to England. At the death of Gov. Burnet in 1730 he was appointed to the government of Massachusetts and New Hampshire, which station he held 11 years, and was then superseded. Repairing to England, he obtained the government of New Jersey, where he arrived in 1747, and where he spent the remainder of his life. He enlarged the charter of Princeton college, and was its chief patron and benefactor. **II. Jonathan,** chief justice of Nova Scotia, second son of the preceding, died at Halifax in March, 1767. He graduated at Harvard college in 1728, studied law at the Temple in London, and was one of the first settlers of Chibucto, afterward called Halifax. In 1760 he was appointed lieutenant governor, and in 1761 chief justice.

BELCHER, Tom, an English pugilist, born at Bristol in 1783, died at Peckham, Dec. 9, 1854. He was the hero of 12 prize fights, in eight of which he was the conqueror, in three he was defeated, and the 12th was a drawn battle. He was one of the 18 pugilists selected to act as pages at the coronation of George IV., to protect the access to Westminster abbey.

BELED UL-JERID, "the land of dates," a sterile region of Africa S. of the Atlas chain, on the borders of the great Sahara, extending from the borders of Morocco to Tripoli. It received its name from the numerous date palms found in its oases.

BELEM, a suburb of Lisbon, Portugal, on the Tagus, S. W. of the city. It derives its name from the church of Our Lady of Bethlehem, built here by King Emanuel in 1499, on the return of Vasco da Gama from his expedition to India around the Cape of Good Hope. This magnificent structure was erected on the site of the chapel in which Da Gama and his companions passed the night in prayer previous to embarkation. The stone is a carbonate of lime obtained in the vicinity, and was originally white, but is now of a rich golden hue. The

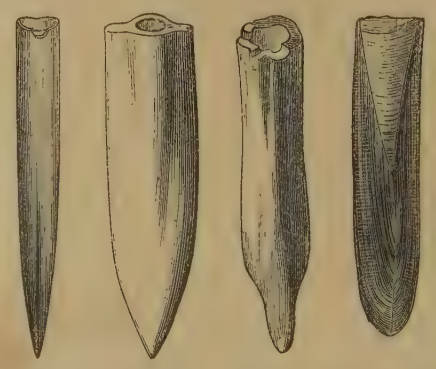
whole building stands on piles of pine. Belem was formerly a separate town. It contains a Gothic church, in which is the tomb of the royal family of Portugal. It has also an old

Tower of Belem.

fortress, of singularly picturesque appearance, called *Torre de Belem*, which rises from the bank of the Tagus, and with its batteries commands that river. This quarter of the city contains a royal palace and the residences of many persons of note.

BELEM (commonly called PARÁ), a city and seaport of Brazil, capital of the province of Grão Pará, on the bay of Guajará, right bank of the estuary of the Rio Pará, 75 m. from the Atlantic, and 1,500 m. N. N. W. of Rio de Janeiro; lat. 1° 28′ S., lon. 48° 30′ W.; pop. about 35,000, of whom in 1871 2,500 were slaves. It was founded in 1616 by Francisco Caldeira Castello Branco, is the fourth commercial city in the empire, and one of the best built, and remarkable for the number and magnificence of its public edifices, especially the cathedral, the church of São João Baptista, the governor's palace, and some others. The houses, mostly of stone, are very neat, and many of them even handsome; but the streets, though regular, are with few exceptions badly paved. The city is divided into two parts, the old and new, the latter having long streets planted with palms or mangabeiras. From July to November high winds prevail, tinging people and buildings with the red dust from the macadamized thoroughfares, and violent thunder storms are of frequent occurrence. Yet the climate is not regarded as unhealthy; the thermometer ranges from 76° to 86° F., and the heat is tempered by refreshing sea breezes. The prevailing maladies are intermittent fevers, and certain affections of the stomach and liver, produced by the water used in the city from wells containing deleterious matter proceeding from animal and vegetable detritus. The meat and vegetables are also of very inferior quality. The harbor is defended by several forts; though capable of admitting vessels of any draft, it is difficult of approach, and the bed is said to be gradually silting up. The surrounding country is extremely fertile, yielding abundant crops of rice, coffee, cotton, tapioca, &c., which, with sarsaparilla, cacao, balsam copaiba and other drugs, isinglass, Maranhão chestnuts, india rubber, hides and leather, form the principal exports. Of these india rubber is by far the most important. The exports for 1870 amounted to $7,643,394 60, $6,000,000 of which were of india rubber alone; but the precedence is likely to be taken before long by cacao. The imports did not exceed $5,000,000. Belem bids fair to become before many years the chief commercial city of northern Brazil. Nine lines of steamers ply fortnightly between it and the upper Amazon and intermediate points; two lines of ocean steamers touch here monthly to and from Europe, and one to and from New York; and there is besides a prosperous coasting trade. Belem has six banks, a university and lyceum, many public and private schools, a scientific club, a public reading-room, a large public library, a botanic garden, and a theatre.

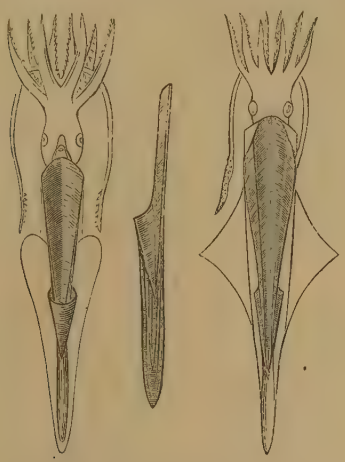
BELEMNITES (Gr. *βελεμνίτης*, from *βέλεμνον*, a dart or arrow), a class of extinct molluscous animals, belonging to the same division as ammonites, termed cephalopods from the organs of motion being arranged around the head. The fossil remains of the animal are met with in the rocks of the upper secondary, and are particularly abundant in the strata of the greensand formation in New Jersey. The part preserved, often detached from the loose strata, is



Belemnites unisulcatus. B. isosceles. B. urnula. B. digitalis.

a pointed cone sometimes eight inches long, of brown color and stony material, resembling in shape the head of a dart or javelin, whence their name. The larger end is hollow, the cavity being of similar shape to that of the whole specimen. They are found by millions in the formations to which they belong, and

from 80 to 90 species of them have been recognized. They early attracted the attention of scientific men as well as of the common people; and it appears from the memoir of M. de Blainville that no fewer than 91 authors, whose names he gives, beginning with Theophrastus, have written on this subject. The ancient inhabitants of Asia Minor are represented by some writers to have designated these fossils by the term *dactyli Idæi*, fingers of Mount Ida, which, however, according to other authorities, was very differently applied, some describing these unknown Dactyli as divine persons worthy of worship, as having nursed and brought up the god Jupiter; and others,



Belemnites restored, after D'Orbigny.

as Sophocles, making them to be the inventors of the manufacture of iron. Popular modern names for them are thunder stones, devil's fingers, and spectre candles. By the researches of Dr. Buckland and Prof. Agassiz the true nature of the belemnites has been fully established. The hollow pointed body is composed of carbonate of lime, part of which was the original fibrous shell, and the remainder introduced by infiltration. Thus the fossil became crystalline and nearly solid. The cavity was the receptacle of the animal, but, as in the genera *bulla* and *sepia*, and the coralline zoöphytes, it by no means covered the fleshy portions; these, on the contrary, extended outside of the shell, and enclosed it, very much as a skeleton is enclosed and covered with the softer portions of the body. Within this cavity was the apparatus of the air chambers and siphon, common also to the ammonite, nautilus, and other chambered shells, by means of which the animal could rise or sink at will. But the belemnites also were provided with the

Belemnites restored by Owen.

ink-bag apparatus of the modern sepia; an important protection for their soft bodies, unguarded as they were by any outer shell. These ink bags were noticed in a communication by Dr. Buckland to the geological society of London in 1829, as found by him in a fossil state, which he supposed, from comparison with known molluscous animals furnished with them, must have belonged to dibranchiate or two-gilled cephalopods connected with belemnites. Subsequently Prof. Agassiz met with specimens retaining the ink bag within the cavity; and the fact being thus established, the name *belemnosepia* was thereupon given to the family in the class of cephalopods comprising all the species of belemnites. From the immense numbers of these animals, and also of the still more abundant varieties of ammonites, which flourished during the periods of the formation of the oölite and cretaceous groups, Dr. Buckland infers that these extinct families filled a larger space and performed more important functions among the inhabitants of the ancient seas than are assigned to their few living representatives in our modern oceans.

BELESTA, a town of France, department of Ariége, 17 m. E. S. E. of Foix; pop. in 1866, 2,545. It is noted for the intermitting spring of Fontestorbes, which rises in a natural grotto or cavern, and forms the principal part of the river Lers, a feeder of the Garonne. The stream which flows from the cavern is 18 or 20 ft. wide and a foot or more deep, and runs very rapidly; yet in the summer and autumn, and whenever there is a drought, it becomes intermittent. The intermission takes place at equal intervals twice in the 24 hours.

BELFAST, a city, port of entry, and the capital of Waldo county, Maine, situated on a broad bay of the same name, on the W. side of the Penobscot river, opposite Castine, 30 m. from the ocean and 110 m. N. E. of Portland; pop. in 1870, 5,278. The harbor is deep and spacious, and always open, so that it is the winter port of the Penobscot. The Passaggassawakeag empties into the Penobscot at this point, and furnishes water power, which is used in the manufacture of lumber. There is considerable ship building and commerce. The valuation of property in 1870 was $2,660,879; in 1860, $1,802,307. During the year ending June 30, 1871, 19 vessels of 9,098 tons were built here. There are 24 public schools, 6 churches, a well endowed academy, 2 evening newspapers, a national bank, a state bank, and a savings bank. The Belfast and Moosehead Lake railroad (now consolidated with the Maine Central) connects Belfast with the Maine Central at Burnham. Belfast was founded in 1770 by settlers from Londonderry, N. H. It was incorporated in 1773, and in 1797 the first church was established. In 1815 the town was invested by the British. The city charter was adopted in 1853.

BELFAST, a seaport town and parliamentary borough of Ireland, county Antrim, on the

Lagan, near its embouchure in Belfast bay, 88 m. N. N. E. of Dublin; pop. in 1871, 174,394 (an increase of nearly 100,000 since 1841). The site of the greater part of the town is low and flat, having been reclaimed from the marshy banks of the Lagan. The river is 250 yards wide, and is crossed by three bridges and two ferries. The streets are regular and spacious, macadamized, and well lighted. A conspicuous architectural ornament is the Albert memorial tower, erected in memory of the prince consort, and finished in 1870. It is 140 ft. in height, and is built in the Venetian Gothic style, and elaborately ornamented. In a niche 32 ft. from the ground stands a statue of Prince Albert; above this portion of the tower is a large clock, and above this again

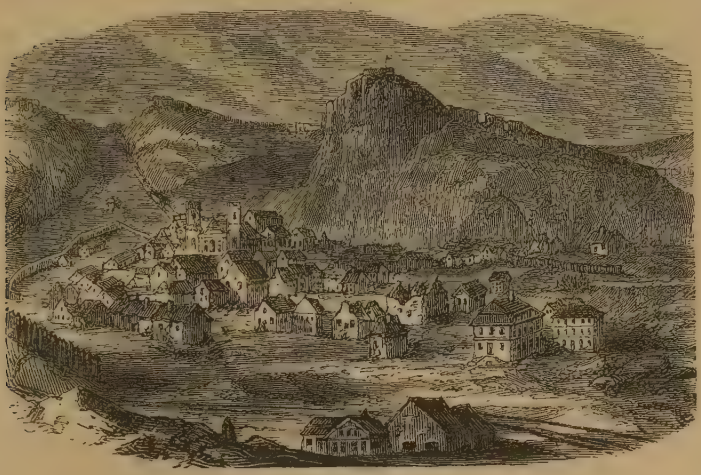
Albert Memorial Tower.

Queen's College.

a belfry. In 1871 there were 80 places of worship, of which 21 were Episcopal (church of Ireland), 28 Presbyterian, 15 Methodist, and 5 Roman Catholic. At the head of its educational institutions is the Queen's college, built of brick and stone at an expense of over £25,000, and opened in 1849. It stands in a conspicuous position in the midst of large grounds, and near the botanic garden. For the maintenance of the institution £7,000 a year is allowed. The "General Assembly college" was opened Dec. 5, 1853, and the Methodist college, erected by voluntary subscriptions at a cost of £24,000, Aug. 19, 1868. There are besides the royal academical institution, founded in 1810, the Belfast academy, the Lancasterian school, and numerous national schools and private seminaries. Belfast has many charitable and benevolent institutions; a natural history society; a royal botanical and horticultural society; a society for the promotion of knowledge; a teachers' association; a theatre; and a mechanics' institute. In 1871 there were 14 newspapers, one of which dates from 1737. Belfast is the great depot of the linen trade of the north of Ireland, and is also the chief seat of manufactures of cotton and linen. There are also distilleries, breweries, flour mills, founderies, tan yards, vitriol works, saw mills, and extensive ship and rope yards. Steamers ply regularly between Belfast and London, Liverpool, Fleetwood, Carlisle, Whitehaven, Glasgow, Greenock, Stranraer, Ardrossan, and Dublin. Three railways diverge from it: N. W., the Northern Counties railway; N. E., the County Down, and S. W., the Ulster railway, in connection with a line to Dublin. The commerce of Belfast is extensive. In 1866 the imports amounted to £12,447,000, and the exports to £11,915,000. In 1870 8,303 vessels, of 1,225,566 tons, entered the port. New docks were opened in August, 1872, one of them being named after Lord Dufferin.—Belfast is a comparatively modern town. It was erected into a municipality and parliamentary borough early in the 17th century. During the civil war in that century it was besieged and taken four times in six years. In consequence of the repeal of the procession act by parliament, Belfast was in August, 1872, the scene of serious troubles between the Orangemen and the Roman Catholics; the riots continuing for several days, with considerable loss of property and life, until they were suppressed by military force.

BELFORT, or **Béfort,** a fortified town of France, formerly in the department of Haut-Rhin, on the Savoureuse, 75 m. S. S. W. of Strasburg; pop. in 1866, 8,400. It has manufactures of iron, paper, hats, and printed calico, and was formerly one of the chief entrepots of the French trade with Germany and Switzerland. It is of great importance in a military point of view, as it controls the *Trouée de Belfort*, the passage between the Vosges and the Jura. The town was ceded to France by Austria by the treaty of Westphalia in 1648, at which time it was a place of little strength, but the French made it a fortress of the second rank. The Germans besieged it in October, 1870, and it capitulated on

Feb. 16, 1871, its garrison of 2,000 men being allowed free departure. At the conclusion of peace Belfort, with its surrounding district (*rayon*), was exempted from the cession of Alsace to Germany; but it is still occupied by a German garrison (1873) pending the complete payment of the French indemnity.



Belfort.

BELGÆ, one of the three peoples who divided the possession of the whole of Gaul among them at the time of its invasion and conquest by Julius Cæsar, the other two being the Celtæ, in the centre, and the Aquitani, between the Garonne and the Pyrenees. The Belgæ occupied the country between the Rhine, Seine, and Marne, embracing modern Belgium and portions of France, Germany, and Holland. (See GAUL.) It is not settled among ethnologists how far the Belgæ and Celtæ of Gaul were of different or kindred races; nor at what time, whether previous or subsequent to this period, the intermigrations with Britain occurred. It is assumed, however, from many considerations, that the Belgæ had at least a mixture of Teutonic blood, if they were not Teutons.

BELGARD, a town of Prussia, in the province of Pomerania, on the Persante, 15 m. S. S. W. of Köslin; pop. in 1871, 6,303. It has a castle, three churches, and important cattle and horse markets.

BELGAUM, a town in the presidency of Bombay, Hindostan, the headquarters of the southern division of the Bombay army, 40 m. N. W. of Dharwar; pop. about 8,000. Its site is elevated and healthy, and it is strongly fortified. The British captured this place in 1818, after a siege of 21 days.

BELGIOJOSO, Cristina, princess of, an Italian patriot and writer, born in Milan, June 28, 1808, died there, July 5, 1871. She was the daughter of the marquis Geronimo Isidoro Trivulzio, and married on Sept. 14, 1824, the prince Emilio Barbian e Belgiojoso, who died Feb. 17, 1858. Their children were a son, who died in 1862, and a daughter who in 1861 became the wife of the marquis Trotti-Bentivoglio. Allied to the most distinguished families and brought up under the influence of Manzoni, the princess Belgiojoso acquired prominence by her social position, her varied accomplishments, and her revolutionary ideas. Expelled from Italy, her house in Paris became after 1830 a centre for scholars, artists, and liberal politicians. Mignet prevailed upon Louis Philippe to obtain from the Austrian government the restoration of her confiscated property, and she employed her fortune in promoting the education and prosperity of her tenantry. She volunteered as the amanuensis of the historian Thierry, studied mathematics under Arago, was intimate with the St. Simonians, and published an *Essai sur la formation du culte dogmatique* (Paris, 1846). In 1848 she equipped volunteers at her own expense in Lombardy; in Rome she shared in the labors of Margaret Fuller for the relief of the wounded patriots; and in 1849 she went into exile in Turkey, while the Austrians again confiscated her property, which was not restored to her till 1855. She thereupon entered upon a literary career, and some have recognized in her the original from whom Stendhal drew the duchess of San Severino, the heroine of his *Chartreuse de Paime.* She became the correspondent of several journals; published in 1850 her *Souvenirs d'exile* in the *National;* edited in Paris in 1851 *Notions d'histoire à l'usage des enfants;* and her travels in the East led to her publication of *Emina, récits turco-asiatiques* (2 vols., Leipsic, 1856), *Asie Mineure et Syrie* (1858), and *Scènes de la vie turque* (1858). In 1860 appeared her *Histoire de la maison de Savoie,* and in 1869 her *Réflexions sur l'état actuel de l'Italie et sur son avenir.*

BELGIUM (Fr. *La Belgique*), a kingdom of Europe, situated between N. E. France, Holland, Germany, and the North sea, and extending from lat. 49° 30′ to 51° N., and from lon. 2° 33′ to 6° 6′ E.; area, 11,372 sq. m.; pop. in 1832, 4,064,235; in 1849, 4,359,090; in 1856, 4,529,360; in 1866, 4,829,320; in 1869, by calculation, 5,021,336. Its greatest length from S. E. to N. W. is 180 English miles, and its greatest breadth, from the northern boundary of Antwerp to the most southern part of Hainaut, is 124 miles. The kingdom is divided into nine provinces, as follows:

PROVINCES.	Area.	Pop., Jan. 1, 1849.	Pop., Dec. 31, 1866.	Pop., Dec. 31, 1869.
Antwerp	1,093	413,824	473,167	485,883
Brabant	1,263	711,332	819,182	862,982
Flanders, W.	1,249	626,847	639,643	660,029
Flanders, E.	1,158	781,143	801,859	829,387
Hainaut	1,437	723,539	846,146	884,319
Liége	1,119	460,663	557,549	584,718
Limburg	931	185,621	195,859	198,727
Luxemburg	1,704	187,978	196,166	204,326
Namur	1,413	268,143	299,808	310,965
Total	11,372	4,359,090	4,829,320	5,021,336

The annual increase of the population since 1856 has been about ·962 per cent. In 1868 there were 163,619 births (of which 12,108 were illegitimate), 36,271 marriages, 60 divorces, and 115,041 deaths. The male sex showed a slight preponderance over the female. The number of emigrants in 1865 was 12,015, of immigrants 9,600. Of the cities of Belgium, one, Brussels, had in 1869 upward of 171,000 (with 8 suburbs, 314,000) inhabitants; 3, Antwerp, Ghent, and Liége, upward of 100,000; and 5, Bruges, Mechlin, Verviers, Louvain, and Tournay, from 30,000 to 50,000 inhabitants. In 1866 the kingdom had 131 communes with more and 2,429 with less than 5,000 inhabitants. The Belgian people consist of two different nationalities: the Flemish, a branch of the German race, and the Walloon, an offshoot of the French. Although only 42·3 per cent. of the total population are purely Walloon, and 49·8 per cent. Flemings (the remainder speaking either both these or other languages), the French is the predominant and the official language. Of late, however, the Flemish majority have begun a vigorous struggle to secure at least equal rights for their language; and thus the nationality conflict has become of great political significance in Belgium. The following table shows the numerical proportion which exists between the two principal nationalities in the several provinces of the kingdom:

PROVINCES.	NUMBER SPEAKING FLEMISH.		NUMBER SPEAKING FRENCH.		NUMBER SPEAKING BOTH LANGUAGES.	
	Inhabitants.	Per cent.	Inhabitants.	Per cent.	Inhabitants.	Per cent.
Antwerp	430,403	92·4	8,887	0·8	28,592	6·1
Brabant	456,175	56·1	216,098	26·6	130,722	16·1
Flanders, W.	564,840	88·0	26,559	4·1	48,677	7·6
Flanders, E.	744,251	92·4	7,837	1·0	51,819	6·4
Hainaut	15,476	1·8	810,260	95·3	17,566	2·1
Liége	21,490	3·9	499,103	89·6	16,338	3·0
Limburg	173,282	88·8	8,734	4·5	12,476	6·4
Luxemburg	184	0·1	169,460	84·7	461	0·2
Namur	390	0·1	299,846	99·1	1,710	0·5
Total	2,406,491	49·8	2,041,784	42·3	308,361	6·4

—The surface of Belgium is generally level. In the southeast there are some high and well wooded lands, traversed by or connected with the Ardennes. South of Verviers there is also a wild tract of elevated country of small extent, the highest elevation not exceeding 2,300 feet. Between the Meuse and the Scheldt there is another ridge. The principal rivers are the Meuse, the Scheldt, the Ourthe, and the Sambre. The Meuse flows from France through the provinces of Namur and Liége into Holland, and is navigable throughout its Belgian course. The Scheldt enters Belgium in the province of Hainaut, and runs across the Belgian territory, receiving the Dender, the Dyle, and other streams, and passing into Holland below Antwerp. It is navigable throughout Belgium, but is obstructed by banks at its mouth. The Ourthe rises in the Ardennes, and falls into the Meuse at Liége. The Sambre flows from France into Belgium, and falls into the Meuse at Namur. The northern part of the country is of tertiary formation. In the southeastern provinces the lower formations are red sandstone and limestone, resting upon granite, quartz, and slate. Fossil animals are very numerous; the limestone caverns through which the river Lesse has made its way are remarkable natural curiosities. East and West Flanders are principally sand.—After England, Belgium yields more fuel than any other country in Europe. There were 155 coal mines in operation in 1866, covering 213,545 acres, and employing 86,721 persons, and producing in 1866 12,774,662 tons (against 5,820,858 in 1850), of the value of 151,031,574 francs. About two thirds of the produce is consumed in the country, and the rest exported to France and Holland. The most extensive coal fields are in the province of Hainaut, which alone in 1866 produced 9,800,000 tons. The production of iron is also large. The best iron is found in the country between the Sambre and the Meuse. Lead, manganese, and other minerals, especially zinc, are found in various parts of the country. The most celebrated zinc mines are between Liége and Aix-la-Chapelle. The country abounds at the same time in building, paving, and lime stones, roofing slate, and marble. The black marble of Dinant is renowned for its beauty. The mineral wealth of Belgium is, next to agriculture, the most important source of the national prosperity. The most celebrated mineral springs are at the famous watering place Spa, near the frontier of Rhenish Prussia.—The canals, though numerous, are not equal in length to those of Holland, being about 300 m. The greatest of these is the Brussels canal, supplied by the river Senne,

which was opened in 1550. Ghent is connected with the sea by a canal opening into the E. Scheldt, which admits vessels drawing 18 feet. The railways of Belgium were the earliest of continental Europe, and rapidly followed those of England, which they have surpassed in unity of design and economy of construction. The principal lines were built by the government. The aggregate length of railways in 1870 was 1,930 m. (against 550 in 1860), of which 1,426 belonged to private companies, and 504 to the state; and 320 m. were in the course of construction. The receipts were upward of 40,000,000 francs, while the total cost of permanent construction had been 756,464,128 francs. Electric telegraphs have been in operation since March 15, 1851. In 1870 the aggregate length of the lines was 2,605 m., and of the wires, 8,293. The number of telegraph offices in 1869 was 433; their aggregate receipts, 1,323,596 fr.; their expenditures, 1,298,915 fr.—The agriculture of Belgium is not surpassed by that of any nation. The originally unfavorable soil has by generations of careful culture been raised to great productiveness. Large farms are rare, the subdivisions of the soil have been carried down to garden size, and less than $\frac{1}{18}$ of the whole area of the kingdom is uprofitable. Flax is an object of peculiar care, and the Belgian system of cultivation is studied everywhere. East and West Flanders alone produce flax to the value of $8,000,000 annually. The artificial grasses are also generally productive, while the production of root crops by artificial manure is matter of elaborate study and attention. Belgium is celebrated for its horses, of which it possesses nearly 300,000. Those of the Ardennes are excellent cavalry horses, and those of Namur are famous draught horses. The number of cattle exceeds 1,200,000, and of sheep 700,000. The government pays special attention to the improvement of horses and cattle.—In commercial pursuits and manufactures Belgium has long enjoyed the highest reputation. But the fame of her linens and woven goods had somewhat deteriorated from the high estimation they enjoyed in the 14th century, until the separation from Holland. The lace of Brussels and Mechlin, the linens and damasks of Liége, the woollens of Ypres, the cotton goods, carpets, and hosiery of the country, compete with the productions of the French and English looms. The machine factory of Cockerill and company, founded at Liége in 1816, is one of the greatest works of the kind in Europe. Liége has a cannon foundery, and is noted for its manufactories of firearms.—The foreign commerce of Belgium during its connection with Holland suffered for the sake of Amsterdam and Rotterdam, and judicious plans of internal improvement have since occupied the national attention. The entries at the Belgian ports, chiefly Antwerp and Ostend, in 1869, were 5,411 vessels, of 1,470,322 tons, and the clearances were 5,326 vessels, of 1,456,965 tons. The merchant navy in 1869 consisted of 67 sailing vessels, of 23,981 tons, and 12 steamers, of 8,762 tons. The number of fishing boats was 265, of 9,087 tons. The imports for the same year amounted to 903,600,000 fr. and the exports to 691,600,000 fr. The imports from the United States from July 1, 1869, to June 30, 1870, amounted to $6,600,000, and the exports to that country $3,140,000. The revenue of Belgium for 1870 was 176,725,000 fr., and the expenditure 176,812,836 fr. The budget for 1873 estimates the receipts at 196,703,500 fr., and the expenditures at 192,620,512 fr., the latter including 49,593,136 fr. for public debt, 53,202,054 fr. for public works, and 37,125,000 fr. for the army. The public debt, commenced by the assumption of 220,000,000 francs of the enormous debt of the kingdom of the Netherlands at the time of the separation, has been constantly increased by the construction of railways, the fortifications of Antwerp, extra military expenditure in 1870, &c., and on May 1, 1870, consisted of 705,874,214 fr. The aggregate debts of the communes amounted to 126,319,085 fr.—The military force of the kingdom, according to the law of April 5, 1868, consists on the war footing of 74,000 infantry, 6,530 cavalry, 14,513 artillery, 2,354 engineers, 1,373 gendarmes; total, 98,770. The standing army on the peace footing numbered 38,970 men. Annually 10,000 men are enrolled by conscription, with the right of furnishing substitutes; the time of military duty begins with the 19th year and lasts eight years, about one half of which is spent on furlough. The principal fortresses of the kingdom are those of Antwerp, Charleroi, Ostend, Ghent, and Namur. Besides the standing army, there is, in accordance with the laws of May, 1848, and July, 1853, a national guard, which comprises all citizens between 21 and 40 able to bear arms. It numbers 125,000 men (and inclusive of the reserve 400,000), but is in active service only in towns having more than 10,000 inhabitants.—The constitution of Belgium is a limited monarchy, with male succession, and in default of male issue the king may nominate his successor with consent of the chambers. The legislative body consists of a senate and house of representatives. The elective franchise is vested in citizens paying not less than 42 fr. annually of direct taxes. The house of representatives consists of deputies in the proportion of 1 to 40,000 of population. In 1869 the number of deputies was 116, chosen from 41 electoral districts. Citizenship is the sole qualification for representatives, and they are elected for four years (except in case of a dissolution), half retiring every two years. The senate has half the number of the house, elected by the citizens for eight years, half retiring every four years. The senatorial qualification is citizenship, domiciliation, 40 years of age, and payment of direct taxes of at least 2,000 fr. annually. The restriction created by this large

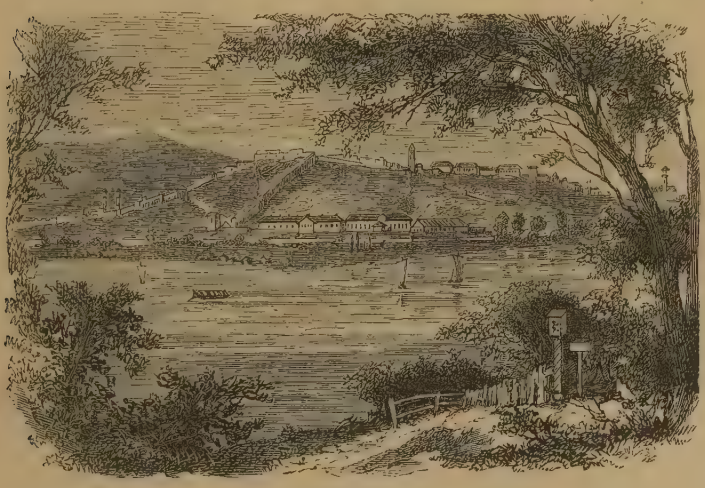
proportion of taxes is mitigated by the admission of those citizens who pay the next largest sums, so that the list shall always be kept up to the footing of at least one eligible person for every 6,000 inhabitants. The representatives receive pay at the rate of about $20 per week. Senators receive no pay. Each house may originate laws, but money bills must originate with the representatives. The chambers assemble as of right on the second Tuesday in November. The king may dissolve the chambers, but the act of dissolution must contain a provision for convoking them again within two months. The executive government consisted in 1871 of six departments, namely: foreign affairs, finance, justice, public works, war, and the interior. The minister of foreign affairs is premier. Besides the heads of these departments there are a number of ministers without portfolio, who form a privy council called together on special occasions by the sovereign. Titles of nobility are allowed by the constitution, but without particular privileges, all Belgians being equal in the eye of the law. Trial by jury on criminal and political charges, and offences of the press, are provided for. Taxes and the army contingent must be voted annually. The law is administered by local and provincial tribunals, with courts of appeal at Brussels, Ghent, and Liége.—Various pernicious influences have produced a vast amount of pauperism. In 1857 the 908,000 families of the kingdom were, according to an official report made to the legislature, divided into 89,000 which were wealthy, 373,000 living in straitened circumstances, and 446,000 living in a wretched condition. Of the latter class 266,000 received support from the state.—The Roman Catholic religion is largely predominant in Belgium. The number of Protestants is variously estimated at from 10,000 to 25,000. The Jews number about 2,000. The stipends of ministers of all denominations are derived from the state. At the head of the Catholic church are the archbishop of Mechlin and the bishops of Ghent, Bruges, Liége, Namur, and Tournay. Monastic institutions are very numerous. In 1866 there were 2,893 monks in 178 monasteries, and 15,205 nuns in 1,144 convents and communities. The "Protestant Evangelical Church," to which the majority of Belgian Protestants belong, is governed by a synod which sits once a year at Brussels, and is composed of the clergymen of the body and a representative from each of the congregations.—There are government universities at Ghent and Liége, a Roman Catholic university at Louvain, and a free university at Brussels. There are superior public schools in most of the cities, and a great number of schools have been established for instruction in particular branches of industry, agricultural processes, chemistry, and design. The conservatory of music at Brussels is one of the most famous in the world. The number of primary schools in 1864 was 5,664 (against 5,520 in 1851), of which 4,006 were under the control of the state. They were attended by 544,761 pupils; and the expenditure incurred for their support by the state, the provinces, and the communes was 10,942,000 fr. About 30 per cent. of the adult population in 1871 were unable to read and write.—The history of Belgium as an independent state dates from 1830, at which time it was separated from the kingdom of the Netherlands. Under the Romans the country formed a part of Gallia Belgica, a name derived from its original inhabitants. (See GAUL, and BELGÆ.) After the fall of the West Roman empire a number of feudal lords achieved power in the Belgic territories, under the Frankish and German monarchs, among whom the counts of Flanders rose to historical distinction. From failure of male heirs their possessions devolved to the house of Burgundy in 1384, which gradually extended its influence, by conquest or treaty, over the greater part of the Netherlands. (See BRABANT, BURGUNDY, and FLANDERS.) On the death of Charles the Bold, his daughter Mary, the greatest heiress of Europe, married Maximilian of Austria, afterward emperor of Germany; and under his successor Charles V. the rule of the Low Countries was joined to the crown of Spain. Both Maximilian and Charles respected in some degree the freedom and rights of their Batavian and Belgic subjects. But Philip II. drove them into that revolt which ended in the independence of the United Provinces, and the confirmation of the yoke of Spain on the necks of the Belgians. (See NETHERLANDS.) From this period Belgium followed the fortunes of Spain. In 1598 Philip bestowed the Flemish provinces on his daughter Isabella and her husband Albert, during which period something was effected toward the settlement of the internal affairs of the province. On the death of Isabella without issue, Spain again assumed the government, and the Spanish Low Countries were for the next century the battlefield of Europe. The cities were taken and retaken, the territory cut up, and passed from one power to another by the treaties of Aix-la-Chapelle (1668), Nimeguen (1678), and Ryswick (1697), until the peace of Utrecht (1713) gave the country to Austria; and, as though these influences had not been sufficiently injurious to the country, the so-called barrier treaty of 1715 delivered over several of the fortresses to Holland, in order to create a barrier against French ambition. Holland closed the Scheldt, and so diverted the trade of Antwerp, and in 1722 the rising commerce of Ostend was sacrificed to the Dutch. The empress Maria Theresa appointed Charles, duke of Lorraine, her viceroy, and under his equitable rule the people enjoyed an interval of peace. Joseph II. shook off the bonds of the barrier treaty with the Dutch, and compelled Holland to withdraw her army of occupation, but could not succeed in reopening the navigation of the Scheldt. He also addressed himself to

the reform of existing abuses; but here, as in other parts of his empire, his precipitation placed a lever in the hands of those who opposed his plans, which they used successfully to excite popular discontent. On Dec. 11, 1789, the opposition, which had manifested itself in a serious revolt, culminated in a movement in Brussels against the garrison, which was forced to capitulate. Joseph and his successor Leopold II. made liberal offers for an adjustment of the differences and for the reestablishment of the constitution; but the liberal leaders stood out for an independent Belgian republic. Internal dissensions soon threw them into the power of the Austrians again, when Pichegru crossed the frontier, under instructions from the French convention, to assist the Belgians. The Austrians were rapidly driven back, and the Belgians found themselves incorporated into the French republic, and eventually they became a part of the empire. On Napoleon's abdication in 1814, the country was put under the control of an Austrian governor, but at the final peace it was united with Holland under Prince William Frederick of Orange-Nassau as king of the new kingdom, called Netherlands, being destined to form a strong bulwark against France. The inclinations and habits of the Belgians, which led them to a French alliance, were not consulted in this settlement, and their dissatisfaction was aggravated by the unwise policy of the Hollanders, and by the marked differences in national character, language, religion, and pursuits. In the states general Holland with about 2,500,000 was to have a number of representatives equal to Belgium with nearly 4,000,000 of people. Belgium had only a debt of 4,000,000 florins, Holland a debt of 1,200,000,000; this was imposed on Belgian industry. The constitution which contained all these objectionable provisions was passed by an assembly in which the dissentient Belgian nobility were an actual majority, but the absent Belgians were reckoned as assenting. The use of the French language in judicial and government proceedings was to be abolished. In May, 1830, disregarding 640 petitions, the government carried a new law of the press. Officials holding Belgian opinions were dismissed. M. de Potter, the head of the Belgian party, opened a subscription for all those who thus suffered for their principles. De Potter and his confidential friends, Tielemans, Bartels, and De Nève, were arraigned for sedition; the charge was proved by their private correspondence with each other, and they were banished. The public mind was in a state of excitement, which was raised to its highest pitch of intensity by the revolution of July in Paris. At length, on Aug. 25, 1830, during a performance of Auber's "Masaniello" at the grand opera of Brussels, the insurrectionary spirit was aroused into action by the music. The theatre was rapidly emptied, the office of the *National* newspaper, the government organ, was sacked, the armorers' shops were broken open, and barricades were erected. The civic guard restored order the next day; but the revolution had spread, and in all the principal cities the same scene was reënacted. On Aug. 28 a congress of citizens assembled in the hôtel de ville of Brussels; they adopted an address to the king, asking for reform of the system of government, dismissal of the unpopular ministers, and trial by jury in criminal prosecutions and proceedings affecting the press. The king received the deputies at the Hague, and refused to pledge himself to anything while under menaces of force, but promised an early consideration of the matter. This answer gave great dissatisfaction. Subsequently the crown prince was induced to visit Brussels. He held a conference with the leading men of the city, and appointed a committee for redress of grievances. The Liége deputation, however, boldly told the prince that nothing short of total separation from Holland would now pacify the people. The king summoned a states general extraordinary on Sept. 13, formed a new ministry under De Potter and De Stassart, and then sent troops to Brussels, and called on the rebels to submit. On Sept. 20 the streets of Brussels were rendered completely impassable. Prince Frederick advanced with 14,000 men, and on Sept. 23 attacked the porte de Saarbrück. After a battle of six hours the troops fought their way through the streets to the palace, and for three days there was an incessant engagement, during which the Dutch made themselves masters of the principal part of the city. But the insurgents, receiving reënforcements from Liége and other towns, recovered strength, and Prince Frederick's position soon became hopeless. He ordered a retreat; Brussels was free; Mons, Ghent, Ypres, and all the other leading towns, at once declared in favor of total separation, and on Oct. 6 the Dutch garrison of Liége capitulated. Antwerp was now the only important place which remained in the hands of the Dutch, and even in that city their authority was rapidly crumbling away. Gen. Chassé had thrown himself into the citadel, and the authorities agreed on an armistice. But the insurgent forces repudiated the right of the magistrates to negotiate with the enemy, and summoned Chassé to surrender. In reply he opened his guns on the quarter of the town in which the revolutionary troops lay, and did much harm to the city, besides destroying a vast quantity of valuable merchandise. A provisional government had been already formed in Brussels, consisting of Baron van Hoogvorst, Charles Rogier, Jolly, Count Félix de Merode, Gendebien, Van de Weyer, Potter, and some others. They appointed the various ministers, summoned a national congress, and settled the basis of a constitution which recognized the monarchical principle. Secretaries Nothomb and Paul Devaux were directed to prepare a draft of a constitution in accordance with this basis. Prince Frederick went so far as to consent

to the independence of Belgium on condition that he should be made its king, but this was of no avail. On Oct. 25 he quitted Antwerp, and on the 27th Gen. Chassé commenced a two days' bombardment of the town, by which wanton act the Dutch party crushed out all chance of a friendly settlement. On Nov. 10 the national congress was opened and the independence of Belgium proclaimed. The form of monarchical government was adhered to, but the exclusion of the house of Orange for ever from the crown of Belgium was carried by an overwhelming majority. King William now turned to the great powers who had given him Belgium and guaranteed his quiet enjoyment of his new dominion. At his request a conference of the European powers was held in London, which ordered an armistice, and the retirement of the troops of both parties within their respective frontiers. On Jan. 20, 1831, the independence of Belgium was acknowledged by the conference, binding Belgium to the assumption of a part of the state debt, which entailed upon her the payment of 14,000,000 florins annually. The crown was offered to the duke de Nemours, Louis Philippe's son, and declined, as the European powers would not countenance that project. The national congress now determined by a majority to appoint a regent in place of the provisional government, and Baron Surlet de Choquier was elected. He took the reins of government and named a ministry, which, being composed of incongruous materials, soon resigned, and another was appointed. The choice of the ministry and national congress now fell on Leopold of Saxe-Coburg, who accepted the crown. His relationship to the royal family of England as widower of the princess Charlotte naturally procured him the sympathy of the British government, and he was soon considered as a kind of mediator between England and France. Not long after his coronation (July 21, 1831) Holland, in defiance of the armistice, sent an army across the frontier, and the new king thus found himself engaged in war, with a kingdom disorganized, an army hastily levied, and an unformed administration. Leopold asked aid from France, which was promptly afforded, and Marshal Gérard, accompanied by the duke of Orleans, marched an army to Brussels, which compelled the Dutch forces to retreat across their frontier. William of Holland had not, however, given his consent to the new order of things in Belgium, seeing that as yet the question of the public debt was not satisfactorily disposed of. Accordingly, the conference determined on compelling Holland to evacuate the Belgian territory, and an Anglo-French fleet was to coöperate with the army under Gérard in reducing the citadel of Antwerp and Forts Lillo and Liefkenshoek. The siege of Antwerp began Nov. 29, 1832, and on Dec. 23 Gen. Chassé capitulated. The other forts were not evacuated, but Leopold declared himself satisfied to hold Limburg and Luxemburg against the strong places in question, and accordingly the French army retired. On Aug. 9, 1832, Leopold married the princess Louise, daughter of Louis Philippe. The new king soon found himself obliged to dissolve the chamber which had elected him, and to summon a second. The final peace was concluded between Belgium and Holland April 19, 1839, at the dictation of the European powers, by which Luxemburg and Limburg were divided between the contending parties, Holland receiving the eastern divisions with the fortresses of Maestricht, Venloo, and Luxemburg. The only effect upon Belgium of the revolutionary agitation of Europe in 1848 was the establishment of an electoral reform and the abolition of the newspaper duty. King Leopold expressed his willingness to resign the crown, but the suggestion was not entertained. The *coup d'état* of Napoleon in 1851 caused fresh embarrassment to Belgium by the influx of French refugees. The government felt obliged to suppress the most obnoxious journals, expel a few refugees, and pass a law punishing attempts against the lives of foreign sovereigns. The conflict between the two political parties, the Catholic and the liberal, turned chiefly on home questions, especially relative to the influence of the clergy in public instruction; but by the year 1857 the liberals had gained the upper hand, ruling the country till 1870. The principal reforms effected during this period were the abolition of the *octrois communaux*, or city gate tolls, and the tax on salt; the substitution of the educational qualification for officeholders instead of the tax-paying qualification; laws against election frauds; and reforms in the penal code. The different copyright treaties concluded with France and other powers, though strongly opposed, proved beneficial to Belgian literature. Commercial treaties were also concluded with France, England, and the United States, on the basis of free trade, similar in spirit to the treaty made between France and England. Leopold died Dec. 9, 1865, and was succeeded by his eldest son, Leopold II. The question of the fortification of Antwerp, which formed for years a bone of contention between the political parties, was finally settled in favor of Belgium in 1870. During the Franco-Prussian war of 1870 Belgium observed a *bona fide* neutrality, forbidding even the exportation of arms and other war material; yet her position might have been endangered had it not been for England, which hastened to conclude a triple treaty with Prussia and France (Aug. 9, 1870), which guaranteed the independence and neutrality of Belgium according to the terms of the treaty of 1839. This triple treaty was to remain in force for only one year after the cessation of the war.—See *Les fondateurs de la monarchie belge*, by Théodore Juste (Brussels, 1865 *et seq.*).

BELGOROD, or **Bielgorod** (Russ., white city), a town of Great Russia, on the Donetz, in the government and 80 m. S. of the city of Kursk; pop. in 1867, 15,200. The town was originally built by the Tartars in the reign of Fedor Ivanovitch, 1597, on a chalk hill, whence its name. It was afterward removed a mile lower down. It is divided into the old and new town, and has three suburbs. The old town is surrounded by rampart and ditch, the new town by palisades only. Belgorod has several factories for refining wax, and for spinning and weaving; it also carries on a considerable trade in hemp, bristles, honey, wax, leather, and soap. Three fairs are held during the year, to which merchants from the south of Russia resort. The environs are very fruitful. Belgorod is the seat of an archbishop, and has 18 churches, 2 convents, and 3 charitable asylums.

BELGRADE (Serv. *Belgrad*, white city; anc. *Singidunum*), the capital of Servia, with a convenient port on the right bank of the Danube, at its junction with the Save, 44 m. S. E. of Peterwardein; pop. in 1866, 25,089. The citadel, formerly occupied by a Turkish garrison, is on a small strip of land between the two rivers, behind which is the city. Its parts are: the Turkish quarter, which slopes to the Danube, and, though no longer inhabited by Moslems, and partly in ruins, still presents an oriental appearance; and the Servian quarter, which borders the Save, with a quay and fine houses in modern style. Belgrade is gradually becoming modernized, churches are superseding mosques, and new buildings are constructed, chiefly in the German fashion. It produces arms, carpets, silk goods, cutlery, and saddles. It is the entrepot of commerce between Turkey and the Austro-Hungarian empire, and the seat of the highest authorities of the principality. Its situation gives it military importance, but the fortifications are now rapidly decaying.—Belgrade was long an object of contention between the Christians and the Turks. It was unsuccessfully besieged by the latter in 1456, when John Hunyady defended it against Mohammed II., but was taken by Solyman the Magnificent in 1521, and held till 1688, when it was taken by the elector of Bavaria. Two years later it was retaken by the Turks. In 1717 it was besieged by Prince Eugene, who was in his turn surrounded by a vastly superior Turkish army. After a prodigious defeat of the latter, the city surrendered. In 1739 the Turks came into possession of it by treaty, retaining it till 1789, when it was again taken by the Austrians under Laudon, who, however, relinquished it to the Turks in 1791. It was partly ruined during the Servian insurrection in 1813. In 1862 a difficulty between the Turks and Servians caused the commander of the citadel to open fire upon the city. In 1863 all the Turkish inhabitants of the city were forced to emigrate. In 1867 the sultan was prevailed upon to withdraw the garrison, and, though reserving the right of sovereignty, to transfer the citadel to Servia. Since then Belgrade has been making rapid progress in every respect.



Belgrade.

BELIAL, a compound Hebrew word, which the Vulgate and the English version of the Bible frequently but improperly render as a proper name. The etymology of the word, and consequently its precise signification, is not certain. The first part is undoubtedly the Hebrew *beli*, "without;" the second part is by some connected with the Hebrew *'ol*, "yoke," when the meaning would be "unbridled;" by others with *'alah*, "to ascend," and the signification would be "ignoble condition;" by others with *ya'al*, "usefulness," the signification being "worthlessness." The last derivation has the greater number of supporters. It is usually preceded by "man of" or "son of." The phrase "man of belial," or "son of belial," is thus equivalent to "a very worthless fellow." In the best manuscripts of the New Testament the word appears as Beliar, the final *l*, as is not unfrequently the case, being changed to *r*.

BELIDOR, Bernard Forest de, a French military engineer and author, born in Catalonia in 1693, died in Paris, Sept. 8, 1761. He was employed by Cassini and La Hire in their measurements of an arc of the meridian; and they recommended him to the duke of Orleans, regent of

France, who appointed him professor of the newly established artillery school of La Fère, which institution acquired great celebrity under his management. About 1740, however, he lost the position through the jealousy of superior officers, and became aide-de-camp of Gen. de Ségur in Bavaria and Bohemia, and was captured at Linz, but exchanged after two months of confinement, after which he joined the staff of the duke d'Harcourt as lieutenant colonel. In 1744 he served under the prince de Conti in Italy, where his skill in reducing strongholds without risking an engagement with the enemy was conspicuous; and subsequently he distinguished himself at the capture of Charleroi, and was promoted to a colonelcy. In 1758 he became director of the arsenal of Paris, and afterward inspector general of engineering. Among his publications are: *Cours de mathématiques*, comprising his lectures at La Fère on the application of mathematics to military engineering (1725; enlarged and revised ed. by Mauduit, 1759); *La science des ingénieurs dans la conduite des travaux de fortification et d'architecture civile* (1729; 2d ed., Paris, 1749, and the Hague, 1753; new illustrated and annotated edition by Navier, Paris, 1837); *Le bombardier français, ou nouvelle méthode de jeter les bombes avec précision* (1731; Amsterdam, 1734); and *Traité des fortifications* (2 vols., 1735). The first volume of a new edition of his greatest work, *Architecture hydraulique* (4 vols., illustrated, 1737–'53), which continues to rank as a great authority, was published in 1819 by Navier, who died in 1836 without finishing the remaining 3 volumes. A German translation appeared at Augsburg (2 vols., 1764–'66). He was among the first to demonstrate the utility of compression globes, two of his memoirs on this subject having been published in the annals of the academy of sciences (1756).

BELISARIUS (Slavic *Beli-tzar*, white prince), a Byzantine general, born at Germania in Illyria about 505, died in Constantinople, March 13, 565. While a youth he served among the private guards of Justinian, and upon the accession of that prince to the throne in 527 was promoted to military command, and in 529 made general-in-chief of the eastern army of the empire, stationed at Dara in Mesopotamia, near the frontier of Armenia. At this town he took into his service, as private secretary, Procopius the historian, whose writings are the principal authority for the events of his life. In 530, near Dara, he gained a decisive victory over an army of Persians nearly twice as large as his own. In the spring of 531 he marched from Dara to protect Syria, which had been invaded from the desert. He baffled the designs of the Persians against Antioch, and although, owing to the rashness of his troops, he was defeated in a battle at Callinicum, April 19, he successfully defended the eastern frontier till the end of the war in 532. Returning to Constantinople, he married Antonina, a woman of ignoble birth and dissolute character, who sometimes accompanied him in campaigns, and at other times intrigued with the empress for his recall. He suppressed an insurrection of the party of the greens in Constantinople against Justinian, attacking them in the race course at the head of his life guards. In 533 he was made commander of a land and naval force of 600 vessels and 35,000 men, with which he sailed from Constantinople against the Vandals in Africa. He took Carthage, captured the Vandal king Gelimer, and sent detachments which reduced Sardinia, Corsica, and the Balearic isles. For these services he was on his return to Constantinople rewarded with the first triumph granted to a subject since the reign of Tiberius, a medal was struck in his honor, and in 535 he was chosen sole consul and awarded a second triumph. In the same year he commanded an expedition to recover Italy from the Ostrogoths. He regained Sicily, subdued a rebellion which had broken out in Africa, and returned to the island and quelled a mutiny in his army. He then captured Naples after a siege of 20 days, and at the end of 536 was in possession of Rome. Here he was besieged in 537 by an army of 150,000 Goths, under Vitiges, their newly elected king. He maintained his position until early in 538, when the army of the Goths retired to Ravenna, whither, after repelling an inroad of the Franks, Belisarius followed and invested the city. During the siege Vitiges obtained terms from Justinian which Belisarius refused to recognize. Then the Goths offered him their support if he would assume the title of emperor of the West. By pretended compliance he gained possession of Ravenna for the emperor, and afterward of all Italy, when he was recalled by Justinian. In 541, with an unpaid and undisciplined army, he defended the eastern frontier against the Persians under Chosroes Nushirvan. In 542 or 543 he was again recalled by the intrigues of the empress Theodora and his wife Antonina, who accused him of disloyalty to Justinian. His treasures were attached, but he was finally pardoned on condition that he should pay a heavy fine and become reconciled to his wife. In 544 the Goths, under Totila, having attempted the reconquest of Italy, Belisarius was sent against them, and during the year 546 strove to prevent their taking Rome. Though unsuccessful in this, he saved it from total destruction, and after its evacuation by Totila entered and held it against him. But no reënforcements being sent him, he gave up his command in September, 548, and his rival Narses succeeded him. His last victory was gained over the Bulgarians, who in 559 invaded the empire and threatened Constantinople. In 563 he was accused of conspiring against the life of Justinian, his property was sequestered, and "the Africanus of new Rome" passed the greater part of the last year of his life in prison. The popular legend that his eyes were put out and that he

passed his last days a beggar in the streets of Constantinople has been generally rejected by modern historians, but is accepted by Lord Mahon (Earl Stanhope) in his "Life of Belisarius" (London, 1830).

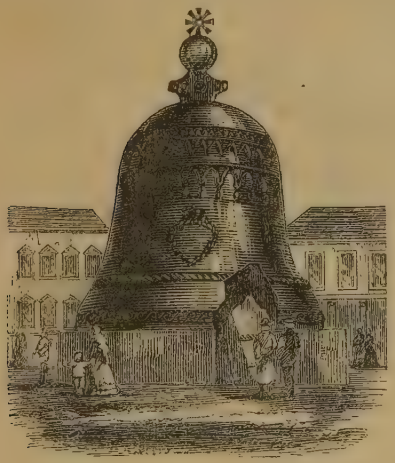
BELIZE. See BALIZE.

BELKNAP, a S. E. county of New Hampshire; area, 387 sq. m.; pop. in 1870, 17,681. Winnepiseogee lake forms its N. E. boundary, Winnepiseogee river flows for some distance along its southern border, and the Pemigewasset touches it on the west. The surface is uneven, containing many hills and small lakes, and is generally fertile. The Boston, Concord, and Montreal, and the Dover and Winnepiseogee railroads traverse the county. The chief productions in 1870 were 20,874 bushels of wheat, 90,687 of Indian corn, 37,837 of oats, 220,705 of potatoes, 36,149 tons of hay, 397,036 lbs. of butter, 81,298 of cheese, 40,051 of maple sugar, and 38,549 of wool. There were 2,146 horses, 4,640 milch cows, 10,978 other cattle, 10,053 sheep, and 2,676 swine. Capital, Gilford.

BELKNAP, Jeremy, D. D., an American clergyman and historian, born in Boston, June 4, 1744, died there, June 20, 1798. He graduated at Harvard college in 1762, and, after teaching school four years, was ordained as pastor of the church in Dover, N. H., in 1767, where he passed 20 years. In 1787 he took the charge of the Federal street church in Boston, which he held till his death. From the age of 15 he kept notes and abstracts of his reading, and a series of interleaved and annotated almanacs, of which curious specimens are preserved. His "History of New Hampshire" was commenced soon after his residence at Dover. The 1st volume appeared at Philadelphia in 1784, the 2d at Boston in 1791, and the 3d in the following year. Not paying the expenses of publication, the legislature of New Hampshire granted him £50 in its aid. In 1790 he projected the Massachusetts historical society, and in 1792 he published, in successive numbers of the "Columbian Magazine," "The Foresters," a historical apologue. The next year he published a life of Watts; in 1794 a series of American biographies; and in 1795 a "Collection of Psalms and Hymns," for a long time in use in many of the New England churches, several of which were written by himself. He was also the author of many fugitive pieces, contributions to magazines, sermons, &c. A life of Dr. Belknap, by his granddaughter, with selections from his correspondence, was published in New York in 1847.

BELL (Saxon *bellan*, to make a hollow sound, to bellow), a hollow metallic vessel, which, by its vibrations when struck, gives forth sounds which vary with its shape, size, and composition. It is an instrument of great antiquity, being spoken of by the old Hebrew writers, as in Exodus xxviii., in which golden bells are prescribed as appendages to the dress of the high priest, that notice may thus be given of his approach to the sanctuary. In very early times the Greeks used bells as signals in their camps and military stations; the tradespeople, according to Plutarch, rang hand bells in the Athenian markets; and they were also probably used in the household, in the same way that we employ them to-day. The Romans at all events seem to have made this use of them; and by them they also announced the time of bathing. In a still older civilization the feast of Osiris is said to have been announced by the ringing of bells. The ancients fastened bells to the necks of their cattle, a custom which has been perpetuated; and in several less important methods of use, in ornamentation, in the decoration of horses at festivals, &c., they frequently employed them.—Bells are said to have been first used for churches about A. D. 400, by St. Paulinus, bishop of Nola, a town in Campania—whence the names *nola* and *campana* given them in the monkish Latin, and still retained in several European languages. In England and France they were in use as early as the 7th century, and the first parish churches appear to have been furnished with their campanile or bell tower, which still continues to be one of their distinguishing features. Several were used in a single church, as is still the custom when arranged in chimes, or, as in Roman Catholic countries, without regard to harmony of tones. The church of the abbey of Croyland in England had one great bell named Guthlac, presented by the abbot Turketulus, who died about the year 870, and subsequently six others, presented by his successor, Egelric, and named Bartholomew and Betelin, Turketul and Tatwin, Bega and Pega. When all these were rung together, Ingulphus says, "*fiebat mirabilis harmonia, nec erat tunc tanta consonantia campanarum in tota Anglia.*" The custom of consecrating church bells, still universal among Roman Catholics and not infrequent in Protestant communities, dates back to a very early period. In Charlemagne's capitulary of 787 we find the prohibition "*ut cloccæ baptizentur;*" and in the old liturgies of the Catholic church is a form of consecration directing the priests to wash the bell with water, anoint it with oil, and mark it with the sign of the cross, in the name of the Trinity. Names were given to bells as early as the year 968, when the great bell of the Lateran church was named by John XIII., for himself, John.—The ancient custom of ringing the passing bell, that those who heard it might pray for the soul that was leaving this world, endured for centuries, and is not yet entirely abandoned; and the ringing of the curfew bell—a custom introduced into England before the Norman conquest, and common on the continent of Europe from the earliest times—remained until the 16th century a signal prescribed by law, to warn the citizens, as its name (from the French *couvre-feu*) indicates, to put out the fires which in those days threatened such danger to the thatched and wooden villages. Other early and long

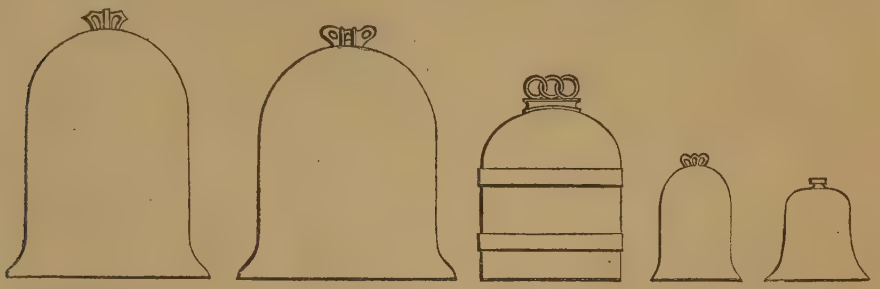
enduring uses of church bells were to give the alarm in case of invasion or other public danger, to peal in celebration of marriages, and to toll during the burial of the dead—duties which, in modified form at least, are still assigned to them.—The bells of Russia are among the most famous of the world. In Moscow alone, before the great fire, there were no less than 1,706 large bells; in a single tower there were 37. One called Bolshoi (the Giant), cast in the 16th century, broken by falling from its support, and recast in 1654, was so large that it required 24 men to ring it, and this was done by simply pulling the clapper; its weight was estimated at 288,000 lbs. It was suspended from an immense beam at the foot of the bell tower, but it again fell during a fire on June 19, 1706, and was a second time broken to fragments. These were used with additional materials, in 1733, in casting the Tsar Kolokol (king of bells), still to be seen at Moscow.



Tsar Kolokol, Moscow.

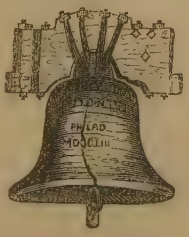
Some falling timbers, in a fire in 1737, broke a piece from its side, which has never been replaced. This bell is estimated to weigh 443,772 lbs.; it is 19 ft. 3 in. high, and measures around its margin 60 ft. 9 in. The value of the metal alone in this bell is estimated to amount to over $300,000. Whether this bell was ever hung or not, authorities appear to differ. The following notice of the bells of Moscow, and of the great bell in particular, is from Clarke's "Travels": "The numberless bells of Moscow continue to ring during the whole of Easter week, tinkling and tolling without harmony or order. The large bell near the cathedral is only used upon important occasions, and yields the finest and most solemn tone I ever heard. When it sounds, a deep hollow murmur vibrates all over Moscow, like the fullest tones of a vast organ, or the rolling of distant thunder. This bell is suspended in a tower called the belfry of St. Ivan, beneath others which, though of less size, are enormous. It is 40 ft. 9 in. in circumference, 16½ in. thick, and it weighs more than 57 tons. The great bell of Moscow, known to be the largest ever founded, is in a deep pit in the midst of the Kremlin. . . . The bell is truly a mountain of metal. They relate that it contains a very large proportion of gold and silver, for that while it was in fusion the nobles and the people cast in as votive offerings their plate and money. . . . I endeavored in vain to assay a small part. The natives regard it with superstitious veneration, and they would not allow even a grain to be filed off; at the same time, it may be said, the compound has a white shining appearance, unlike bell metal in general, and perhaps its silvery appearance has strengthened if not given rise to a conjecture respecting the richness of its materials. On festival days the peasants visit the bell as they would a church, considering it an act of devotion, and they cross themselves as they descend and ascend the steps leading to the bell." After Mr. Clarke's visit the czar Nicholas, in the year 1837, caused the great bell to be taken out of the deep pit in which it lay, and to be placed upon a granite pedestal. Upon its side is seen, over a border of flowers, the figure of the empress Anne in flowing robes. The bell has been consecrated as a chapel; the door is in the aperture made by the piece which fell out. The room is 22 ft. in diameter and 21 ft. 3 in. high. The bells of China rank next in size to those of Russia, but are much inferior to them in form and tone. In Peking, it is stated by Father Le Compte, there are seven bells each weighing 120,000 lbs. One in the suburbs of the city is, according to the testimony of many travellers, the largest suspended bell in the world. It is hung near the ground, in a large pavilion, and to ring it a huge beam is swung against its side. A bell taken from the Dagon pagoda at Rangoon was valued at $80,000. Among the bells recently cast for the new houses of parliament, the largest weighs 14 tons. The next largest bell in England was cast in 1845 for York minster, and weighs 27,000 lbs., and is 7 ft. 7 in. in diameter. The great Tom of Oxford weighs 17,000 lbs., and the great Tom of Lincoln 12,000 lbs. The bell of St. Paul's in London is 9 ft. in diameter, and weighs 11,500 lbs. One placed in the cathedral of Paris in 1680 weighs 38,000 lbs. One in Vienna, cast in 1711, weighs 40,000 lbs.; and in Olmütz is another weighing about the same. The famous bell called Susanne of Erfurt is considered to be of the finest bell metal, containing the largest proportion of silver; its weight is about 30,000 lbs.; it was cast in 1497. At Montreal, Canada, is a larger bell than any in England, weighing 29,400 lbs.; it was imported in 1843 for the Notre Dame cathedral. In the opposite tower of the cathedral is a chime of 10 bells, the heaviest of which weighs 6,043 lbs., and their aggregate weight is 21,800 lbs.—There are few bells of large size in the United States. The heaviest

ever made here was the alarm bell formerly on the city hall in New York. It was cast in Boston, and weighed about 23,000 lbs. Its diameter at the mouth was about 8 ft., its height about 6 ft., and thickness at the point where the clapper struck 6½ or 7 in. The wooden tower in which it was hung having been burned in 1858, it was placed in a separate tower in the rear of the hall. In 1867 it was dropped and broken in the process of removal, and recast in smaller fire bells. The bell now on Independence Hall in Philadelphia is celebrated as being connected with the ever memorable 4th of July, 1776, when it



Bolshoi, Moscow, 21 ft. high, 18 ft. diam. | Tsar Kolokol, Moscow, 19 ft. 3 in. high, about 19 ft. diam. | Peking, 14½ ft. high, 13 ft. diam. | Erfurt, 10½ ft. h., 8¼ ft. diam. | Great Bell of Parliament, 5 ft. 9 in. h., 7 ft. 1 in. d.

first announced by its peal the declaration then made, the most important event in the history of our country. It was imported from England in 1752, and, having been cracked on trial by a stroke of the clapper, was recast in Philadelphia under the direction of Mr. Isaac Norris, to whom we are probably indebted for the following inscription, which surrounds the bell near the top, from Leviticus xxv. 10: "Proclaim liberty throughout all the land, unto all the inhabitants thereof." Immediately beneath this is added: "By order of the assembly of the province of Penn^{a}. for the State House in Phil^{a}." Under this again, "Pass & Stow, Phil^{a}., MDCCLIII." In 1777, during the occupation of Philadelphia by the British, the bell was removed to Lancaster. After its return it was used as a state house bell until the erection of the present steeple with its bell in 1828. Then it ceased to be used excepting on extraordinary occasions. Finally it was removed to its present appropriate resting place. Its last ringing, when it was unfortunately cracked, was in honor of a visit of Henry Clay to Philadelphia. There are no other bells of particular interest in this country. Those used upon the fire alarm towers in our cities are from 10,000 to 11,000 lbs. in weight. They are hung in a fixed position and struck by a hammer, instead of being turned over.—Bells have been made of various metals. In France iron was formerly used, and in other parts of Europe brass was a common material. In Sheffield, England, the manufacture of cast-steel bells was introduced several years since. The



Liberty Bell, Philadelphia.

material is said to have the advantages over the ordinary composition of greater strength and less weight and cost. They have been used in various parts of the United States for schools, manufactories, and steamboats, and for churches, ranging in weight from 100 to over 5,000 lbs. They appear to have given satisfaction, and to possess the power of sending their tones to a great distance. They are said to be well adapted for fog, fire, and alarm bells. The smaller steel bells do not compare so favorably in tone with bells made of bell metal as do those of larger size. Steel bells are also made in Germany. As the swinging of heavy bells often endangers the towers in which they are hung, it is of no little consequence to reduce as much as possible their weight. Steel bells are cast by pouring the contents of the steel pots into the bell mould instead of into ordinary ingot moulds. Bell metal is an alloy of copper and tin in no fixed proportion, but varying from 66 to 80 per cent. of copper, and the remainder tin. Other metals are also often introduced, as zinc, with the object of adding to the shrillness of the sound, silver to add to its softness, and also lead. Dr. Thompson found an English bell metal to consist of copper 800 parts, tin 101, zinc 56, and lead 43. Cymbals and gongs contain 81 copper and 19 tin. Mr. Denison, of England, thinks the use of silver is entirely imaginary, and that there is no reason for believing it could be of any service. He condemns the use of all other materials but copper and tin, and advises that contracts for bells stipulate that the alloy shall consist of at least 20 per cent. of tin, and the remainder copper. Three and a half to one is perhaps the best proportion.—The tone of a bell depends upon its diameter, height, and thickness. The German bell founders have a rule which regulates these dimensions. The thickness of the sound bow where the clapper strikes, and

which is the thickest part, being equal to 1, the height should be 12, the diameter at the mouth 15, the diameter of the top 7½, and the weight of clapper $\frac{1}{40}$ of that of the bell. The tone is regulated by the thickness, a thick bell having a higher note than one that is thin. As the precise pitch cannot be attained in casting, the bell is toned afterward, either by reducing the thickness where the hammer strikes, to produce a lower note, or by chipping away the edge and reducing the diameter to make it more acute. In conformity to the laws of acoustics, the number of vibrations of a bell varies in inverse ratio with its diameter, or the cube root of its weight; so, for a series of bells forming a complete octave, the diameters should go on increasing with the depth of tone, as for *do*, 1; *re*, $\frac{8}{9}$; *me*, $\frac{4}{5}$; *fa*, $\frac{3}{4}$; *sol*, $\frac{2}{3}$; *la*, $\frac{3}{5}$; *si*, $\frac{8}{15}$; *do*, $\frac{1}{2}$.—A work on church bells, by the Rev. W. C. Lukis, appeared at London in 1857. The Rev. Alfred Gatty has published "The Bell, its Early History and Uses" (London, new ed., 1848), and Mr. E. B. Denison's "Lectures on Church Building" treats of bells.

BELL, a central county of Texas, watered by Little river and its head streams, the Leon and Lampasas; area, 1,097 sq. m.; pop. in 1870, 9,771, of whom 1,104 were colored. It has a rolling surface, and a soil of sandy loam, well adapted to pasturage. Forests of cottonwood and live oak cover about one fourth of the county. There are several chalybeate springs. The chief productions in 1870 were 358,360 bushels of Indian corn, 14,296 of sweet potatoes, 2,896 bales of cotton, and 19,575 lbs. of wool. There were 7,425 horses, 4,430 milch cows, 1,494 working oxen, 30,976 other cattle, 9,718 sheep, and 12,467 swine. Capital, Belton.

BELL, Andrew, an English clergyman, born at St. Andrews, Scotland, in 1753, died at Cheltenham, England, Jan. 27, 1832. After studying in St. Andrews university, he visited America, and in 1789 went to India, where at Madras he became chaplain of Fort St. George. He found in the mission schools of India a monitorial system, which on his return to England he proposed for adoption into English schools. It consists in a division of the school into classes, and of the classes into pairs, the two members of a pair being each pupil and tutor of the other. It was not, however, till an analogous system had been introduced by the Quaker Joseph Lancaster into the schools of the dissenters, that Dr. Bell was authorized by the English church to employ it in schools under his charge. He published several works upon educational subjects, and left his fortune (amounting to more than £120,000) for the endowment of schools.

BELL, Sir Charles, a British surgeon and anatomist, born in Edinburgh in November, 1774, died at Hallow Park, Worcestershire, April 29, 1842. He began his education in the high school and university of his native city, and pursued his professional studies under his elder brother John. He was admitted in 1799 to the college of surgeons, became at the same time one of the surgeons to the royal infirmary, and while still a youth delivered lectures before 100 pupils on the science of anatomy. He removed in 1806 to London, where he immediately began a course of lectures, and rapidly rose to distinction. He now published his work on the "Anatomy of Expression," which was designed to show the rationale of those muscular movements which follow and indicate the excitement of the various passions and emotions. His "System of Operative Surgery" was published in 1807. He supported himself unconnected with any medical schools till 1811, when he was invited to the Hunterian school, and three years later he was appointed surgeon to the Middlesex hospital, an institution which during the 22 years of his connection with it he raised to the highest repute both by his striking manner of lecturing and his great dexterity as an operator. He visited the fields of Corunna and Waterloo immediately after the battles, and gave his services to the wounded. In 1821 he produced his ideas on the nervous system in a paper in the "Philosophical Transactions." It immediately arrested the attention of anatomists throughout Europe, some of whom contested with him the priority of discovery; yet it was fully proved that Dr. Bell had taught the doctrine for many years to his pupils, had explained it in a pamphlet, a private edition only of which was printed, in 1810, and had clearly stated it in letters to his brother in 1807, when all his rivals were teaching the old theory. The principle of the discovery is that there are distinct nerves of sensation and of motion or volition, one set bearing messages from the body to the brain, and the other from the brain or will to the body. It was shown by Dr. Bell that the brain and spinal marrow are likewise divided into two parts, which minister respectively to the functions of motion and sensation; that those roots which join the back part of the spinal marrow are nerves of feeling, messengers from the senses, but incapable of moving the muscles, while those roots which have their origin in the front column of the spinal marrow and the adjacent portion of brain are nerves of voluntary motion, conveying only the mandates of the will. He showed that though three distinct nerves may be bound together in a single sheath for convenience of distribution, they yet perform different functions in the physical economy, and have their roots divided at the junction with the brain. The nerves of the different senses are connected with distinct portions of the brain. For this discovery Bell received a medal from the royal society of London in 1829, and upon the accession of William IV. he was invested, in company with Brewster, Herschel, and others, with the honor of knighthood, in the new order then instituted. He was also made senior lecturer on anatomy

and surgery in the London college of physicians, where his lectures were attended both by pupils and practitioners, and where he attracted crowds by a series of discourses on the evidence of design in the anatomy of the human body. He published about this time two essays, "On the Nervous Circle," and "On the Eye," having reference to the theory of a sixth sense, and a treatise on "Animal Mechanics," for the society for the diffusion of useful knowledge. Being invited to take part in the great argument published by the bequest of the earl of Bridgewater, he wrote the treatise on "The Hand," and he soon after assisted Lord Brougham in illustrating Paley's "Natural Theology." In 1836 he accepted the chair of surgery in the Edinburgh university, and afterward visited Italy, making observations, with which he enriched a new edition of the "Anatomy of Expression." He died soon after returning to England.

BELL, George Joseph, a Scottish lawyer, born at Fountainbridge, near Edinburgh, March 26, 1770, died in Edinburgh, Sept. 23, 1843. His first legal publication was a treatise on the laws of bankruptcy, which in 1810 was enlarged and published under the title of "Commentaries on the Laws of Scotland." His subsequent works on the law of Scotland are standard text books in the courts of that country. He was at the head of two commissions for improving the administration of civil justice in Scotland, and from the year 1821 was professor in the university of Edinburgh.

BELL, Henry, a Scottish inventor, born at Torphichen, near Linlithgow, April 7, 1767, died March 14, 1830. A millwright by trade, he went to London when his apprenticeship expired, and while in Mr. Rennie's service conceived the idea of propelling vessels by steam, and in 1800 and 1803 made unsuccessful applications to the admiralty for assistance. He then returned to Scotland, and in 1811 launched a boat on the Clyde, making a steam engine for it with his own hands. The first trial took place on the Clyde in January, 1812. Three-horse power was successfully applied at first, subsequently increased to six. His first boat is preserved in the museum of Glasgow university. The city of Glasgow settled a small annuity on him, and the British government gave a small pension to his widow. A monument to his memory has been erected on the rock of Dunglass, a promontory on the Clyde, 2½ m. from Dumbarton.

BELL, John, a Scottish physician and traveller, born at Antermony, in the west of Scotland, in 1691, died July 1, 1780. At the age of 23 he received the degree of M. D., and went to St. Petersburg, where he presented letters to the court physician of Peter the Great, Dr. Areskin, through whose influence he received an appointment as surgeon to an embassy about to proceed to Persia. Leaving St. Petersburg in July, 1715, he did not reach Ispahan, where the shah held his court, till March, 1717. He returned to St. Petersburg Dec. 30, 1718. He departed in July, 1719, attached to an embassy to China, through Moscow, Siberia, and the great Tartar deserts, to the great wall of China, reaching Peking in November, 1720. After residing half a year in Peking, he returned to Moscow, which he reached in January, 1722. The czar having made him his chief physician, in place of Areskin, now dead, he joined in the expedition headed by Peter himself to assist the shah of Persia in routing the rebel Afghans, and returned with him. Soon afterward he revisited Scotland, but was at St. Petersburg in December, 1737, when, negotiations for peace between Russia and Turkey having failed, he was sent to Constantinople with new proposals, and returned to St. Petersburg in May, 1738. He finally settled as a merchant in Constantinople, where he married in 1746, and soon after returned to Scotland, fixing his residence on his estate of Antermony. His "Travels from St. Petersburg in Russia to Various Parts of Asia" appeared in 1763 (2 vols. 4to).

BELL, John, a Scottish surgeon, born in Edinburgh, May 12, 1763, died in Rome, April 15, 1820. He studied for his profession at the medical schools of his native city, taught a private school of anatomy, and gave lectures on surgical anatomy. His ideas gave offence to the established professors, but notwithstanding an active opposition, his merits secured him a large class of pupils. However, his rivals managed to exclude him and his class from the public infirmary, in which he had been accustomed to practise gratuitously, and then he gave up his lectures, and addressed himself to private practice only. His works are: "Anatomy," afterward completed by his brother, Sir Charles Bell; "Discourses on the Nature and Cure of Wounds" (2 vols. 8vo); and "The Principles of Surgery (3 vols. 4to). Besides these he wrote letters on professional education, and a posthumous work on Italy.

BELL, John, an American lawyer and statesman, born near Nashville, Tenn., Feb. 18, 1797, died at Cumberland Iron Works, Tenn., Sept. 10, 1869. He was the son of a farmer in moderate circumstances, who gave him a good education at Cumberland college (now Nashville university). He was admitted to the bar in 1816, settled at Franklin, Williamson county, and was elected to the state senate in 1817, when only 20 years old. He soon saw his error in entering so early into public life, and declining a reëlection, devoted himself for the next nine years to his profession. In 1826 he became a candidate for congress against Felix Grundy, one of the most popular men in the state, who had the powerful support of Andrew Jackson, then a candidate for the presidency. Mr. Bell was nevertheless elected in 1827, by 1,000 majority, and continued a member of the house of representatives for 14 years. Though at first an ardent supporter of the doctrine of free trade, he was led to change his views, and afterward was ever an earnest advocate of the

protective system. He opposed the South Carolina doctrine of nullification, and was chairman of the committee to consider questions connected with the subject. For 10 years he was chairman of the committee on Indian affairs. He was in favor of a United States bank, though for reasons peculiar to the time he voted against the bill for its recharter in 1832. He protested against the removal of the deposits, and refused to vote for a resolution approving that measure. This refusal was one of the causes which led to the subsequent breach between himself and President Jackson and the democratic party, and finally to his coöperation with the whigs. This change of party relations was marked by his election as speaker of the house of representatives in 1834, in opposition to James K. Polk. The final separation between Mr. Bell and Gen. Jackson took place in 1835, when Mr. Bell declared himself in favor of Judge White for the presidency, in opposition to Mr. Van Buren, and strongly aided White in carrying the state of Tennessee for almost the first time against the democratic party. When the question of the reception of petitions for the abolition of slavery in the District of Columbia was agitated in the house of representatives in 1836, Mr. Bell alone of the Tennessee delegation favored their reception, and, though assailed at home, was sustained by the people. In 1838, when Atherton's anti-petition resolutions were introduced, he voted against them. In 1841 Mr. Bell became secretary of war in President Harrison's cabinet. With the rest of the cabinet, Mr. Webster only excepted, he resigned office on the separation of President Tyler from the whig party, in the autumn of that year. The whig majority in the next Tennessee legislature which met after his withdrawal from the cabinet offered him the office of United States senator. This he declined, and remained in voluntary retirement until he was elected to the state senate in 1847. The same year he was elected to the United State senate, and reëlected in 1853. He was especially prominent as an opponent of the annexation policy. In 1854, when the Nebraska bill was presented to the senate, Mr. Bell protested against its passing; and in the controversy on the admission of Kansas, in March, 1858, he took decided ground against the so-called Lecompton constitution, and in an elaborate speech charged that it tended directly to the overthrow of the Union. In 1860 he was nominated by the "Constitutional Union" party for president, with Edward Everett for vice president, and received the electoral votes of Virginia, Kentucky, and Tennessee. Mr. Bell now retired from active public life, and during the civil war took no prominent part in politics.

BELL, John, an English sculptor and author, born in Norfolk in 1800. His best known artistic works are "The Eagle Slayer" (1837), "Dorothea" (1841), "The Babes in the Wood," and "Andromeda" (1851). For the new houses of parliament he made the statues of Lord Falkland and Sir Robert Walpole, and for Guildhall the Wellington monument. His "Guards Memorial" is in Waterloo place, Pall Mall, London; his statue of "Armed Science" and his "Crimean Artillery Memorial" are at Woolwich; and for the prince consort's memorial in Hyde Park he executed the group of "The United States directing the progress of America." He originated the principle of entasis and definite proportions applied to the obelisk, for which a medal was awarded to him by the society of arts in 1859. He is noted for not following classical models and for his realistic method. He has published "Compositions from the Liturgy," a "Free-hand Drawing Book for the Use of Artisans," "Primary Sensations of the Mind," and "The Drama of Ivan."

BELL, Luther V., M. D., LL. D., an American physician, son of Gov. Samuel Bell of New Hampshire, born at Chester, N. H., Dec. 20, 1806, died near Budd's Ferry, Md., Feb. 11, 1862. He entered Bowdoin college at the age of 12, and graduated in 1821, before he had completed his 15th year. He received his medical degree from the Hanover medical school while yet under 20, and commenced practice in New York, but returned to New Hampshire. One of his earlier operations, the amputation of the femur, was successfully performed, in default of any other accessible instruments, with the patient's razor, a tenor saw, and a darning needle for a tenaculum. He was chosen superintendent of the McLean insane asylum at Charlestown, Mass., entered upon his duties there in January, 1837, and continued to discharge them till 1856, when he resigned. In 1852 he was nominated as the whig candidate for congress, and received the highest vote; but there were three candidates, and a majority of the whole vote being required, a second trial was had, in which his opponents united upon one candidate, and he was defeated. In 1850 he was a member of the state council, and in 1853 of the convention for revising the state constitution. In 1856 he was the whig candidate for governor, but was defeated by his "American" opponent. When the civil war broke out he went as surgeon to a regiment, and so remained until his death.

BELL, Thomas, an English zoölogist, born at Poole, Dorsetshire, Oct. 11, 1792. He is the son of a physician, and has been professor of zoölogy at King's college, London, since 1832, and was lecturer at Guy's hospital from 1816 to 1860, president of the Ray society from its foundation to 1859, secretary of the royal society from 1848 to 1853, and president of the Linnæan society from 1853 to 1861. He has published a monograph of the *testudinata* (7 parts, completed in 1836), a "History of British Reptiles" (1839), a "History of British Stalk-eyed Crustacea" (1853), and "The Anatomy and Diseases of the Teeth."

BELLADONNA (Ital., literally, beautiful lady), a name given to several different plants, as to

the *atriplex hortensis*, *amaryllis belladonna*, and the *atropa belladonna*. The amaryllis is a lily of great beauty and blushing appearance. It grows wild at the Cape of Good Hope, and is well known in cultivated gardens in England and France. The name is also in common use for the medicinal extract of the atropa, and in the pharmacopœias for the root and leaves of that plant, from which the extract is obtained. This is a plant of the *solanaceæ* family, known by the common name of deadly nightshade. In England, Germany, and northern France it is met with in shady places along the sides of the walls, flowering in June and July, and ripening its fruit in September. In America it is successfully cultivated in gardens. It grows from three to four feet in height, with straight and strong stems. The leaves, of oval shape and pointed, are in pairs of unequal size; the flowers are large, bell-shaped, and of a dull violet-brown color. The fruit resembles a cherry, for which it is sometimes mistaken by children, with fatal consequences; it contains numerous seeds, and yields a violet-colored juice of sweetish taste. All parts of the plant are highly poisonous. The leaves are most usually employed for the extraction of the alkaloid principle, though the root and berries also yield it to alcohol and water. (See ATROPIA.) Extracts and tinctures of belladonna are used in medicine, as well as the alkaloid. The latter should be used with great caution, on account of its extreme activity; but it is preferable to the other preparations (which vary materially in strength), on account of the greater precision with which the dose may be determined. It is very rapidly absorbed either from the stomach or when administered subcutaneously. It is eliminated by the urine. One of the most characteristic effects of atropia is the dilatation of the pupil, which may take place from $\frac{1}{100}$ of a grain or a corresponding amount of extract of belladonna. The accommodation of the eye is also paralyzed by it. An eye under its influence is able to see at a distance with perfect distinctness, but near vision, like reading, for instance, is difficult or impossible. A peculiar dryness of the fauces and tongue, and a marked acceleration of the pulse, result from moderate doses, $\frac{1}{80}$ to $\frac{1}{20}$ gr. When larger doses are taken, delirium, usually of a cheerful or whimsical character, and sometimes drowsiness, are added. A certain amount of diuresis, masked by a temporary retention of urine, moisture of the skin, and in rare cases a scarlet efflorescence, are further symptoms. When a poisonous dose has been given, these symptoms increase, and death takes place, with feeble pulse, subsultus, coma or delirium, and sometimes convulsions. It is somewhat remarkable that rabbits are hardly at all susceptible to the action of belladonna. It is sometimes used medicinally in some spasmodic nervous affections, as epilepsy and chorea; for the relief of pain either of the visceral or cutaneous nerves; in cases of habitual constipation and of incontinence of urine; and to check certain secretions, especially of the mammary glands, and to prevent suppuration. Its power for the latter purpose cannot be regarded as fully proved. As an anodyne it is inferior to opium. The claims made in its behalf as a preventive of scarlet fever have not been sustained by proof. In ophthalmic surgery it finds, when locally applied, extensive use in dilating the pupil.—In poisoning by belladonna, after emptying the stomach, tannic acid, or iodine dissolved in water with iodide of potassium, may be used to render comparatively inert any remaining portion of the alkaloid. The caustic alkalies decompose atropia, but only after a few hours' interval; so that, although they should not be prescribed with it, they cannot be relied upon as antidotes. The antagonism between the physiological effects of belladonna and opium exists only in regard to a portion of the symptoms, and those not the most important; but the question as to the efficacy of each as an antidote to the other in cases of poisoning cannot be regarded as definitely settled. In therapeutic doses belladonna may be used with opium to avoid some of the unpleasant after effects of the latter drug.

Belladonna.

BELLAMONT, or **Bellomont, Richard Coote,** earl of, royal governor of New York and Massachusetts, born in 1636, died in New York, March 5, 1701. He was the second Baron Coote in the Irish peerage, was a member of parliament, and one of the first to espouse the cause of the prince of Orange. For this he was attainted in 1689, but was in the same year made earl of Bellamont in the Irish peerage by William III., and appointed treasurer and receiver general to Queen Mary. In May, 1695, he was appointed governor of New York, but did not arrive there till May, 1698, having meantime received a commission also as governor of Massachusetts, to which New Hampshire was adjoined in 1699. He went from New York to Boston in May, 1699, and was received by 20 companies of soldiers and a vast concourse of people. He took every means to ingratiate himself with the people, and obtained a larger salary than any of his predecessors had been able to get. Though but 14 months in the colony, the grants made to him were £1,875. His administration was occupied in the pursuit of the pirates who infested the coast, one of whom, the notorious Kidd, he secured and sent

to England in 1700. Hutchinson speaks of Bellamont as being a hypocrite in a pretended devotion to religion. It appears, however, that while living at Fort George, in New York, he passed much time in meditation and contrition for his youthful excesses. His earldom expired with him, but was afterward revived in his family, and finally expired in 1800.

BELLAMY, Mrs. **George Ann,** an English actress, born in London, April 23, 1733, died in Edinburgh, Feb. 15, 1788. Her mother, who had been Lord Tyrawley's mistress, married Capt. Bellamy, who abandoned her on the birth of this child, which was born some months too soon to claim consanguinity to him. She was educated at a convent in Boulogne from the age of 4 to 11, when she returned to England. Lord Tyrawley, her actual father, took notice of her, gave her a house near London, and introduced her to his friends. When he went on an embassy to Russia, he left her under the protection of a lady of rank, with an annuity of £100 so long as she held no intercourse with her mother, who had seriously offended him; but she preferred to reside with her mother, and forfeited the money. Having derived an inclination for the stage from her associates, she was introduced to Mr. Rich, manager of Covent Garden theatre, who, on hearing her recite some passages in "Othello," engaged her as a performer. She appeared as Monimia in the tragedy of "The Orphan," and her performance during three acts was dull and spiritless. In the fourth act (to use her own words) she "blazed out at once in meridian splendor." From that time her professional career was brilliant. After many alterations of fortune, a free benefit, given her by the players in 1785, took her out of the debtors' prison, to which she was remanded in the following year. She published an "Apology for her Life" (6 vols. 12mo, 1785).

BELLAMY, Joseph, D. D., an American theologian, born at North Cheshire, Conn., in 1719, died at Bethlehem, Conn., March 6, 1790. He graduated at Yale college in 1735, and was ordained pastor at Bethlehem in 1740. He remained in studious retirement until the famous revival of 1742, when, leaving his charge, he began, in the manner of the time, a constant and extensive course of preaching. After the religious excitement had passed over, he returned to his parish and established a school of theological instruction, in which for many years he educated numbers of pupils for the ministry. Several sermons and treatises were published by him from 1750 to 1762, which in 1811 were collected in three volumes, with a sketch of his life, and republished in 1850. His system of divinity coincides generally with that of President Edwards, with whom he was intimate.

BELLARMIN, Robert (Roberto Bellarmino), an Italian theologian and cardinal, born of a noble family at Monte Pulciano, near Florence, Oct. 4, 1542, died in Rome, Sept. 17, 1621. He was the nephew of Pope Marcellus II., and at the age of 18 entered the society of the Jesuits. St. Francis Borgia, who succeeded Laynez as general, sent him to Louvain, where he became a powerful controversial writer. Sixtus V. sent him with his legate to France during the wars of the league, and after his recall he was employed in different offices at Rome. Clement VIII. decorated him with the Roman purple in 1598. During his whole career Bellarmin lived a simple ascetic life. In 1601 he was made archbishop of Capua, where he resided and administered that see till 1605, when Paul V. made him librarian of the Vatican. He spent the last 15 years of his life at Rome, wholly devoted to his duties there, and to the study of theology. At the conclave which followed the death of Clement VIII., he was against his own will made a candidate for the tiara; and at the subsequent conclave after the short reign of Leo XI. came within a few votes of the number requisite for an election. He left many theological works, principally of a controversial character.

BELLARY. I. A district of Madras, British India, situated between lat. 13° 40′ and 15° 58′ N., and lon. 75° 44′ and 78° 19′ E.; area, 11,352 sq. m.; pop. about 1,200,000. It is noted for its healthy climate. It has on an average less rain than any other portion of southern Hindostan, and artificial irrigation is needed in some districts to make it habitable. **II.** A fortified town, capital of the district, in lat. 15° 5′ N., lon. 76° 57′ E., 270 m. N. W. of Madras; pop. about 30,000, besides the garrison. It is connected by railway with the principal towns of India. The fort is built on a granite hill 2 m. in circumference and 450 ft. high, the summit of which constitutes the upper fort, but without accommodations for troops. The lower fort is half a mile in diameter, and contains the barracks, arsenal, commissariat stores, and a Protestant church. The town is well built, and has many pagodas, several mosques, missionary establishments, schools, and a Bible society.

BELLAY. I. Guillaume du, seigneur de Langey, a French soldier and diplomatist, born near Montmirail in 1491, died at St. Symphorien, Jan. 9, 1543. He entered the army at an early age, and was rapidly promoted, attracting the attention and securing the confidence of Francis I., who employed him not only as a soldier—showing such skill as to be called by a contemporary the greatest captain of his time—but also in special diplomatic missions to England, Germany, and Italy. In 1537 he was made viceroy of Piedmont, and ruled over the province till the end of 1542, when, although very sick and obliged to make the journey in a litter, he set out to carry some important news to the king. He died on the way at the castle of St. Symphorien, without delivering his message. His *Mémoires* were published in Paris in 1569. He wrote a work on the art of war, published in 1548; and also an *Épitome de l'antiquité des*

Gaules (Paris, 1556 and 1587), in which he endeavored to prove the French descended from the Trojans. We owe to him a description of the field of the cloth of gold, where he witnessed the meeting of Francis and Henry VIII. in 1520. He made concerning the magnificent and costly dresses of the courtiers there the remark often erroneously attributed to Henry IV., that "many carried their mills, their forests, and their meadows on their shoulders." **II. Jean du,** brother of the preceding, a cardinal and diplomatist, born in 1492, died in Rome, Feb. 16, 1560. In 1527, being then bishop of Bayonne, he was sent on a mission to England, where Henry VIII. had already begun to show signs of rebellion. In 1532 he was made bishop of Paris, and in 1533 again sent to England, and induced Henry to agree that he would not further contend against the church, if time were given him to prepare a defence of his previous conduct. Du Bellay secured these terms from Pope Clement VII., but Henry did not keep the compact, and was excommunicated. Paul III. made him a cardinal in 1535, but he continued to reside in Paris, and when Charles V. entered France, and the king left the capital to march against the enemy, Du Bellay showed unexpected talent as a military commander, in putting the city into a state of defence. Throughout the war he proved himself an able officer, holding for most of the time the appointment of lieutenant general. On the accession of Henry II., however, he found himself supplanted by the cardinal de Lorraine, and retired to Rome, where he spent the remainder of his life. He left several volumes of controversial writings concerning the diplomatic affairs of his time; and many letters, of which a few have been published as historical documents in the works of other authors. Several Latin poems from his pen were also published in Paris in 1546, under the title of *Poëmata Elegantissima*. **III. Joachim du,** a French poet, canon of Notre Dame de Paris, born near Angers in 1524, died Jan. 1, 1560. He was a favorite with Francis I., with the queen of Navarre, and with Henry II. Though a priest, the license of the times allowed him to devote himself to a lady named Viole, on whom he wrote a collection of 115 sonnets, which he called his canticles. They were very successful. Du Bellay was called the French Ovid; and when, after spending three years with his uncle the cardinal du Bellay at the papal court, he published 183 sonnets entitled *Regrets*, and 47 on the antiquities of Rome, the public admiration extended across the channel, and was shared by the English Spenser, who translated and paraphrased several of the poems. His contemporary Ronsard being known as the *prince de l'ode*, Du Bellay was spoken of as the *prince du sonnet*. Du Bellay's appointment as canon of Notre Dame in 1555 was probably obtained through his uncle's influence at Rome, as he paid no attention to ecclesiastical duties. Du Bellay's poetical works were voluminous, including, besides those already named, a *Discours de la poésie*, a metrical translation of the 4th and 5th books of the Æneid, and numerous odes, elegies, and minor poems. He also wrote in prose a celebrated *Défense et illustration de la langue françoise*. All these are found in his collected works (Paris, 2 vols. 8vo, 1567); and the last named was published in 1849.

BELLE, Jean François Joseph de, a French general, born at Voreppe, in Dauphiny, May 27, 1767, died in Santo Domingo in June, 1802. He entered the army in 1789, and earned rapid promotion; distinguishing himself before Düsseldorf, he was made general in 1795. He was in the Italian campaign of 1799, and on the fatal day of Novi, when, Joubert having fallen, the French army was forced to retreat, he directed the artillery. In 1801 he was in the army which sailed under command of Leclerc to reduce Santo Domingo; he participated in the action which compelled Maurepas to capitulate, and soon after attacked the army of Dessalines, forced him to retreat, and pursued the fugitives into the fort of Crête-à-Pierrot. De Belle himself, while advancing at the head of his column, was severely wounded, carried from the field of battle, and soon died.

BELLECHASSE, an E. county of the province of Quebec, Canada, bordering on the St. Lawrence opposite the island of Orleans, and separated from Maine by the S. W. branch of the St. John; area, about 600 sq. m.; pop. in 1871, 5,520. It is traversed by several small rivers and by the Grand Trunk railway. Chief town, St. Michael.

BELLE-ISLE. I. Charles Louis Auguste Fouquet, duke de, a French soldier and statesman, born at Villefranche, in Rouergue, Sept. 22, 1684, died Jan. 26, 1761. He was at the siege of Lille in 1708, and at the conference of Rastadt in 1714. In 1732 he became lieutenant general, was the chief negotiator of the treaty of 1735, by which France acquired Lorraine, and was afterward governor of Metz and the three Lorraine bishoprics. Cardinal Fleury in 1741 appointed him marshal and plenipotentiary in Germany, where he assiduously worked to put the elector of Bavaria, whom he accompanied to Frankfort, on the German throne as the emperor Charles VII. Schlosser says that "he and his brother conducted the whole affairs of Germany, as it seemed most agreeable to the ambition of the one and to the vanity and the pride of the other, but by no means to the true advantage of their country." In the war against Maria Theresa and her allies, he took Prague, Oct. 26, 1741, but finally barely escaped, amid great disasters, to Eger, Dec. 17, 1742. In December, 1744, while proceeding to Berlin, he was arrested by the English at Hanover and detained in Windsor castle from Feb. 19 to Aug. 12, 1745, when he was exchanged. In 1746, as general-in-chief, he operated successfully against the enemy on the French-Sardinian frontier, but his invasion of Savoy in 1747 ended fatally. He was never-

theless promoted from the rank of count to that of duke and peer (1748), became a member of the academy (1749), and subsequently minister of war, and was to the last one of the most ambitious, brilliant, and influential of the unscrupulous ministers of Louis XV. His memoirs were published in London in 1760. **II. Louis Charles Armand Fouquet,** chevalier de, brother of the preceding and associated with him in diplomatic and military life, born in 1693, killed in battle, July 15, 1747. He was a dashing soldier, ambitious intriguer, and dissolute cavalier. At Exilles, Savoy, at the head of 50 battalions of his brother's division, he attempted against the advice of his most experienced officers to storm the inaccessible rocks and forts behind which the Piedmontese, though numbering only 21 battalions, were impregnably intrenched. He perished with almost all his officers and many of the men.

BELLE ISLE. I. North, an island at the mouth of the strait of the same name, between Labrador and the extremity of Newfoundland, 16 m. distant from the nearest part of the coast of Labrador, in lat. 52° N., lon. 55° 20′ W. Its circumference is about 21 m. On the N. W. side is a harbor for small fishing vessels, and a cove on the E. side affords shelter for shallops. **II. South,** an island off the E. coast of the N. W. peninsula of Newfoundland, of about the same size as the preceding, 16 m. E. of Canary or Canada bay; lat. 51° N., lon. 55° 35′ W.

BELLE ISLE, Strait of, an outlet of the gulf of St. Lawrence, between Labrador and the N. W. peninsula of Newfoundland; length, about 80 m.; breadth, 12 m. Its navigation is considered to be hazardous. The Labrador side is indented with bays—Temple bay, Wreck cove, Green bay, Red bay, and Black bay. The opposite coast is devoid of indentations.

BELLE-ISLE-EN-MER, an island in the bay of Biscay on the W. coast of France, a little N. W. of the mouth of the Loire, department of Morbihan, and 8 m. S. of Quiberon point; pop. about 10,000. It is of an oblong form; length, about 11 m.; breadth, 6 m. Its surface is about 160 ft. above the sea, and treeless. The island is noted for its fine breed of draught horses. It has several druidical monuments. The chief place is Le Palais, on the N. E. coast (pop. 4,900).

BELLENDEN, William, a Scottish writer of the early part of the 17th century, the time of whose birth and death is uncertain. He is famous for pure Latinity, and was educated at Paris, where he became professor of belles-lettres, and continued to reside, though he was invited to Scotland by James I. before the latter succeeded to the English crown. He collected in 1616 three treatises, which he had published before separately, under the title of *Bellendenus de Statu.* This work was republished in 1787 by Dr. Parr, who prefixed to it a long introduction. He also wrote *De tribus Luminibus Romanorum,* which Dr. Middleton, in his "Life of Cicero," was accused of borrowing from.

BELLEROPHON, a hero of Grecian mythology, whose real name was Hipponous, was a son of Glaucus, king of Corinth, and Eurymede, and a grandson of Sisyphus. He was called Bellerophon in consequence of having slain a Corinthian eupatrid named Bellerus. After this crime he fled to Prœtus, king of Argos, whose wife became enamored of him. Bellerophon received her advances coldly, and she accused him of having made insulting offers to her, insisting that he should be put to death. Prœtus, not wishing to violate the laws of hospitality by slaying a man who was his guest, despatched him with a letter to Iobates, king of Lycia, in which that potentate was charged to have Bellerophon killed. Iobates hereupon sent him to combat the monster Chimæra. Bellerophon first caught the winged horse Pegasus, with the aid of Minerva, and mounting him, soared into the air and slew the monster from on high. Iobates next sent him to encounter the Solymi and the Amazons, but the hero still proved victorious. Lastly, Iobates placed a band of the bravest Lycians in ambush to attack him on his return. This device, however, was fruitless, for Bellerophon slew them all. The Lycian monarch, now perceiving that he was invincible, revealed to him the contents of the letter which he had brought from Prœtus, gave him his daughter Cassandra in marriage, and made him heir to the throne of his kingdom. The latter days of Bellerophon were unfortunate. As he attempted to soar to heaven on the back of Pegasus, Zeus sent a gadfly which so stung his winged steed that he cast his rider to the earth, where, lame and blind, he wandered lonely in the Aleïan fields.

BELLEVAL, Pierre Richer de, a French botanist, born in Châlons-sur-Marne in 1558, died in Montpellier in 1623. Henry IV., learning that the medical students of France were accustomed to complete their education in the universities of Italy, where the professors had botanical gardens under their charge, founded by royal edict in 1593 a botanical garden at Montpellier, in which he appointed Belleval a professor. Belleval is regarded as one of the founders of strictly scientific botany, since he was among the first to consider plants according to their general characteristics, without regard to their medicinal properties. He had 400 plates engraved, which were praised by Tournefort and Linnæus, but have been nearly all lost.

BELLEVILLE, a city and the capital of St. Clair co., Illinois, 85 m. S. of Springfield and 14 m. S. E. of St. Louis; pop. in 1860, 7,520; 1870, 8,146. It is pleasantly situated on high ground. The surrounding country is productive and populous, and contains beds of coal. The city is actively engaged in trade and manufactures, and contains several churches and banks, a handsome court house, and 27 public schools (including a high school), attended in 1871 by 1,500 pupils. There is also a Roman Catholic academy, with 12 instructors and 180

male and 350 female pupils. A daily newspaper (German), and five weeklies, of which two are in German, are published. The St. Louis, Alton, and Terre Haute (Belleville and Southern Illinois division), and the St. Louis and Southeastern railroads intersect here.

BELLEVILLE, chief town of the county of Hastings, province of Ontario, Canada, situated about 50 m. W. of Kingston, on both sides of the river Moira, which here debouches into the bay of Quinté; pop. about 8,000. It is a port of entry, and does considerable business in imports, and also in the export of lumber, flour, and other agricultural produce. In the vicinity are iron works and quarries of valuable marble. The town is on the line of the Grand Trunk railway, and steamers ply regularly between this point and Kingston and Montreal.

BELLEY (anc. *Bellica*), a town of Burgundy, France, in the department of Ain, 38 m. S. W. of Geneva, agreeably situated in a fertile valley near the Rhône, which is here crossed by a suspension bridge; pop. in 1866, 4,624. It was a place of note in the time of Julius Cæsar. It was burned by Alaric, was possessed by the dukes of Savoy during the middle ages, and was ceded to France in 1601. The bishopric of which it is still the seat was founded in 412. Lithographic stones are obtained from neighboring quarries.

BELLIARD, Augustin Daniel, count, a French soldier, born at Fontenay-le-Comte, Poitou, March 25, 1769, died in Brussels, Jan. 28, 1832. He entered the army with a captain's commission, and being cashiered for having served with Dumouriez, under whom he had distinguished himself in Belgium, especially at Jemappes, he reëntered as a private, fought under Hoche in La Vendée, and in Italy under Bonaparte, acquiring the rank of general on the battlefield of Arcole. He was prominent in the Egyptian campaign, and though obliged to capitulate at Cairo, he was promoted in 1801 to the command of a division, and in 1805 to that of Murat's staff. After aiding in the occupation of Madrid, he remained in command there from 1808 till the Russian campaign of 1812, in which he covered himself with glory, especially at the battle of the Moskva. Though severely wounded, he was active in reorganizing the French cavalry after its return to Germany, and lost an arm at Leipsic. Winning new honors at Craonne, he was placed at the head of the cavalry, and received from the emperor, April 3, 1814, the grand cordon of the legion of honor. Louis XVIII. raised him to the peerage, June 4, and to the rank of major general; but having during the hundred days served again under Napoleon, he was after the second restoration kept in restraint till June 3, 1816, and deprived of his peerage till March 5, 1819. In March, 1831, Louis Philippe sent him as ambassador to Brussels, where he made himself very useful to the cause of Belgian independence. His townsmen honored him with a monument, and Vinet published his autobiography (*Mémoires du général Belliard, écrits par lui-même*, 3 vols., Paris, 1834).

BELLING, Wilhelm Sebastian von, a Prussian soldier, born Feb. 15, 1719, died at Stolpe, Pomerania, Nov. 28, 1779. In 1739 he was a cornet, in 1758 commander of a regiment of hussars, and having been successful in many campaigns, especially in grappling at the head of a small force with the whole Swedish army, he was made major general in 1762, lieutenant general in 1776, and received in 1778 the order of the Black Eagle. He was the most famous hussar officer of the seven years' war. His small size and that of his horse made him a target for the enemy; but his contempt for danger and his lively manners made him a special favorite with Frederick the Great.

BELLINGHAM, Richard, colonial governor of Massachusetts, born in 1592, died Dec. 7, 1672. He was a lawyer, and one of the original patentees of the colony, to which he removed in 1634. In 1635 he was made deputy governor, and in 1641 was elected governor in opposition to Winthrop by a majority of six votes. He was reëlected in 1654, and after the death of Endicott was chosen again in May, 1666, and continued in the executive chair till his death, having been deputy governor 13 and governor 10 years. He was chosen major general in 1664, in which year the king sent four commissioners to inquire into the state of the colony, when, according to Hutchinson, Bellingham and others obnoxious to James II. were required to go to England to account for their conduct, but refused, the king being appeased by the present of a shipload of masts. His wife having died, in 1641 he married a second time; an event of which a contemporary speaks thus: "A young gentleman was about to be contracted to a friend of his, when on a sudden the governor treated with her, and obtained her for himself." The banns were not properly published, and he performed the marriage ceremony himself. He was prosecuted for a violation of the law, but at the trial he refused to leave the bench, and sat and tried himself, thus escaping punishment. In his last will he provided that after the decease of his wife and of his son by a former wife, and his granddaughter, the bulk of his estate should be spent for the yearly maintenance "of goodly ministers and preachers" of the true church, which he considered to be that of the Congregationalists. This will the general court set aside on the ground that it interfered with the rights of his family. One of his sisters, Anne Hibbens, was executed at Salem in June, 1692, during the witchcraft persecution.

BELLINI. I. Jacopo, an early painter of the Venetian school, born in Venice about 1405, died in 1470. He was a pupil of Gentile da Fabriano, and is said to have been taught oil painting, which was then a secret, by Andrea del Castagno, and in turn taught it to his sons, Gentile and Giovanni. Almost all his works

have perished; one supposed to be authentic is in the Manfrini palace at Venice, and represents the portraits of Petrarch and Laura. **II. Gentile,** son of the preceding, born in 1421, died in 1507. He was employed by the Venetian government on an equal footing with his brother in decorating the hall of the grand council in the doge's palace, and was also celebrated for his portraits. His fame attracted the notice of Mohammed II., conqueror of Constantinople, and Bellini visited the grand seignior. He painted a number of pictures for Mohammed, and also struck a medal for him, the sultan presenting him with a gold chain and 3,000 ducats. **III. Giovanni,** second son of Jacopo, and generally regarded as the founder of the Venetian school, born in 1426, died in 1516 (according to some, a few years earlier). Some of his earliest works were portraits, among them that of the doge Loredano. He was employed by the republic to decorate the great hall of the council with a series of historical paintings, covering the entire walls. These were destroyed by fire in 1577. He also painted a picture of the Virgin Mary surrounded by saints, for the church of San Zaccaria in Venice. One of his last works was a Bacchanal; this he left incomplete, and it was finished by Titian.

BELLINI, Laurentio, an Italian anatomist, born in Florence, Sept. 3, 1643, died Jan. 8, 1704. He was instructed in mechanics by Borelli, and at the age of 22 attained the chair of philosophy and theoretical medicine, and continued a brilliant career in this position for nearly 30 years. When 50 years of age he abandoned his professorship, and returned to Florence.

BELLINI, Vincenzo, an Italian composer, born in Catania, Sicily, Nov. 1 or 3, 1802, died at Puteaux, near Paris, Sept. 24, 1835. His father and grandfather were musicians of indifferent reputation, and he was educated in the conservatory of Naples at the expense of his native town. An opera entitled *Bianca e Fernando*, produced before he was 24 years old, became so fashionable, thanks to the favor of the court, that he was immediately engaged to write another for La Scala at Milan. This was *Il Pirata* (1827), the extraordinary success of which was owing in part to the singing of Rubini. *La Straniera* followed in 1828, with Tamburini and Madame Méric-Lalande, and *I Capuleti ed i Montecchi* in 1830; both were well received, but it became customary to substitute for the third act of the latter work an act from Vaccai's more vigorous *Romeo e Giulietta*. The next productions of Bellini, *La Sonnambula* and *Norma*, both brought out at Milan in 1831, showed a decided advance. They were written for Madame Pasta, but Malibran probably did more for *Norma* than any other artist. *Beatrice di Tenda* (Venice, 1833) was too tragic for the genius of Bellini, though it contains some admirable numbers. The composer now visited England to superintend the production of one of his works, and thence went to Paris, where he had been engaged to write an opera for the Théâtre Italien. The fruit of this contract was his last and best work, *I Puritani*, produced with Grisi, Rubini, Tamburini, and Lablache in the cast, and received with the utmost enthusiasm. He had made an agreement for another work for Paris, when he died after a few days' sickness. Bellini had slight knowledge of counterpoint; his scores are weak, and his accompaniments commonplace; but he excelled as a fresh, graceful, and fertile melodist, and surpassed all other Italian composers in the sympathetic character of his music. In private life he was estimable, refined, and agreeable.

BELLINZONA (Ger. *Bellenz*), a town of Switzerland, capital of a district of the same name, and alternately with Lugano and Locarno the capital of the canton of Ticino, on the left bank of the Ticino, 50 m. N. by E. of Milan; pop. about 2,200; of the district, 12,000. It is situated between two rocky heights on the Italian slope of the Alps, at the union of the roads from the St. Gothard and San Bernardino, and Lakes Maggiore and Lugano. The Ticino is here crossed by a bridge of 14 arches and restrained by a long stone dam. It is the key of the Italian-German boundary, and the partly ruined castles on the Giori rocks, Castello di Mezzo and Castello Corbario, which overhang the town, have been strengthened by additional fortifications. On an isolated rock stands a third castle, the Castello Grande, which is used as an arsenal and prison. The church of St. Peter and St. Stephen, with 11 marble altars and a high cupola, is the finest in the canton. The convent of the Augustinians is used as a government house. The inhabitants are farmers and cattle drivers, and many of them seek employment in neighboring Italian towns, leaving the women at home to till the land. There is an active transit trade. The town long belonged to the dukes of Milan, and has been often a bone of contention, chiefly between Swiss, Italians, and Germans; the Swiss ruling it almost uninterruptedly since the end of the 15th century. The language spoken is an Italian dialect.

BELLMAN, Karl Mickel, a Swedish poet, called the Anacreon of Sweden, born at Stockholm, Feb. 15, 1740, died Feb. 11, 1795. He published religious poems and a translation of the fables of Gellert, but acquired renown only by the songs which he was accustomed to improvise at banquet tables. His songs and idyls, which he published under the title of "Letters of Fredman," are peculiarly naïve, tender, and charming. His longest poem, "The Temple of Bacchus," is of an elegiac character, and marked by depth and brilliancy of thought. In 1829 a monument was erected at Stockholm in his honor, and a society named after him, the "Bellman," celebrates there an annual festival in his memory. His collected works were published at Gothenburg in 5 vols., 1836–'8.

BELLONA, the Roman goddess of war. She is sometimes styled the colleague, sometimes the sister, sometimes the wife of Mars. Her temple stood in the Campus Martius, near the circus of Flaminius. The priests of Bellona were called Bellonarii, and originally as often as they sacrificed to their goddess they were obliged to lacerate their arms or legs, that they might be able to offer upon her altar a portion of their own blood. The 24th of March in every year was the principal day of her worship, and that day was distinguished in the Roman Fasti by the title of *dies sanguinis.*

BELLOT, Joseph René, a French naval officer, born in Paris in March, 1826, lost off Cape Bowden, Aug. 18, 1853. He was a midshipman in the siege of Vera Cruz in 1838, and a lieutenant in 1851, and in 1852 obtained permission to serve as a volunteer in the English expedition sent out in search of Sir John Franklin, and commanded by Captain Belcher. On one occasion he offered to carry despatches by a journey over the ice. Being overtaken by a storm, the ice on which he was, with two of his companions, was severed from the land. He went to the other side of a hummock to reconnoitre, and was never seen again. His own diary, which was published in 1855, furnishes the best narrative of his adventures.

BELLOWS, an instrument contrived for propelling air through a pipe, employed for blowing fires, supplying air to ventilate mines, filling the pipes of an organ with wind, and other purposes. The use of this apparatus may be traced back to a very early period. It is spoken of by Jeremiah (vi. 29), and alluded to by Ezekiel (xxii. 20). When Homer describes the forging of the iron shield of Achilles, he speaks of the furnace into which the materials were thrown being blown by 20 pairs of bellows (*φύσαι*). From the remarks of Plautus in his *Fragmenta*, and of Virgil in the Georgics, it would appear that the bellows of the ancients were made wholly of leather. The first account we have of wooden bellows is by Henry bishop of Bamberg, in 1620, when one named Pfannenschmidt (bellows smith) commenced the manufacture of them in the Hartz forest, and by his success excited the jealousy of those of the same trade in the place. His art was disclosed only to his son, and the monopoly of the forest remained in the hands of his descendants to this century. Hans Losinger, an organist of Nuremberg, is by some supposed to have invented the wooden bellows in 1550. Among many primitive nations of Asia and Africa this machine is still employed in its simplest form for blowing by hand the fires of rudely constructed furnaces, probably of the same form as those in use in the times of Homer and of the Jewish prophets.—As ordinarily constructed, the instrument consists of two similar plates of wood connected by a strip of leather fastened around their edges, which with the plates completely encloses a chamber for air, and is so made that the plates may be made to approach and recede by folding and unfolding the leather. In the lower plate is fixed a valve opening inward, through which the air enters as the plates are separated, and which closes as they are brought together, forcing the air to seek some other outlet. This is provided in a tube of small area compared to that of the valve, so that the air is made to rush outward with great velocity. As the action of this machine is to give an intermittent blast, it has been improved by introducing a third plate, attached to the lower one as this was to the upper, thus making a double bellows. The two lower plates have valves opening upward, and the pipe or nozzle for the exit of the air is in the upper of the two chambers. The middle plate is worked up and down by a lever arm, and weights are placed upon the top of the bellows to force out the air continuously, and others are suspended from the bottom board to keep the lower chamber distended with air. A circular form is sometimes given to the plates or boards, and the air chamber surrounded by the leather is cylindrical. When shut together it is very compact and portable, which renders it a convenient form for portable forges. The inhabitants of Hindostan make use of such bellows for blowing their small iron furnaces. A man sits down between two of them, and with one hand upon each works them alternately up and down, producing a tolerably continuous blast, but of small capacity and force.—The bellows used by the Chinese is a simple contrivance for forcing air with any desired pressure, and is upon the same principle with the large blowing machines now in general use. It is a square wooden box or pipe, with a piston rod working in one end, and carrying a closely fitting piston, by the movement of which the air is pushed through a smaller pipe in the other end. On the reverse motion the air enters through valves and refills the box.—Bellows are used for obtaining a very hot flame with illuminating gas. The blast of air is directed through the centre of the yellow gas flame, which immediately assumes a pale blue color and a long pointed form. By losing its illuminating power the available heat is very much increased. Such a flame is made use of by the chemist in trying experiments which require an intense heat on a small scale, and by the glass blower in making the melted glass assume the desired form. A very good form of bellows for the glass blower, which until recently was only made in Paris, is now manufactured in this country. It consists essentially of a cylinder 8 inches in diameter and 14 inches high, made of leather or india rubber, which has three horizontal wooden disks or diaphragms, one at the top, one a little below the middle, and one at the bottom; thus dividing the cylinder into two compartments, of which the lower one is the force pump, while the upper is the reservoir which retains the air and equalizes the blast. The details are as follows: The middle disk alone is fixed permanently to

the glass blower's table. In the lower disk a check valve is placed, which allows the air to enter but not to leave the lower compartment. The centre disk has a valve similarly arranged, with reference to the upper compartment. The lower disk can be forced upward by means of a lever connected with a treadle, thereby forcing the contained air into the upper compartment. The upper disk is continually pressed downward by a spiral spring which compresses the enclosed air, and yields in consequence a steady and powerful blast through a tube which for convenience is placed on the upper surface of the middle disk.—The useful effect of the bellows is in exciting combustion, by furnishing a continuous stream of oxygen in the fresh supplies of air, and in removing by the force of the blast those products of combustion which ordinarily exclude the approach of the air and impede the continuation of the process. Its power of rapidly exciting vivid combustion and intense heat is well seen in the action of the smith's bellows in common use. Excepting for some small operations for metallurgic purposes, and for other objects not requiring either a large volume or great pressure of air, the ancient bellows is now for the most part replaced by more efficient apparatus, as the so-called blowing machines and fan-blowers, descriptions of which will be found under BLOWING MACHINES.

BELLOWS, Henry Whitney, D. D., an American clergyman, born in Boston, June 11, 1814. He was educated at Harvard college and the divinity school in Cambridge, where he completed his course in 1837. On Jan. 2, 1838, he was ordained pastor of the first Congregational church in New York, afterward called All Souls' church, in which relation he still remains (1873). He was the chief originator of the "Christian Inquirer," a Unitarian newspaper of New York, in the year 1846. In 1854 he received the degree of D. D. from Harvard university. Of his numerous pamphlets and published discourses, the most conspicuous are his "Phi Beta Kappa Oration," 1853, and his noted defence of the drama, 1857. His occasional contributions to the reviews, and especially the "Christian Examiner," are marked by independence of thought and boldness of expression. In 1857 he delivered a course of lectures on the "Treatment of Social Diseases" before the Lowell institute in Boston, attracting much attention by his vigorous remarks on many subjects of deep interest. In 1860 he published in New York a volume of sermons on "Christian Doctrine," and in 1868–'9 the account of an extended European journey, under the title of "The Old World in its New Face" (2 vols. 12mo). During the civil war he was the president of the United States sanitary commission.

BELLOWS FALLS, a village of Rockingham township, Windham county, Vt., on the Connecticut river, 53 m. by rail S. S. E. of Rutland; pop. in 1870, 697. The river is here interrupted by several rapids and falls, the whole descent being about 44 feet. These are the falls concerning which Peters, in his history, relates that the water becomes so hardened by pressure between the rocks that it is impossible to penetrate it with an iron bar. The river is crossed by a bridge, 212 feet long, built in 1812. The village contains several mills and manufactories, and is an important railway centre, being the point of junction of the Vermont Central, Rutland and Burlington, and Cheshire railroads.

BELLOWS FISH (called also trumpet fish and sea snipe), a spiny-rayed fish of the lophobranchiate or tufted-gilled order, and genus *centriscus* (Linn.). In this genus the snout is tubular, with a very small mouth at the end, without teeth; the body oval and compressed, with small hard scales trenchant on the abdomen; a spinous dorsal fin very far back, with a strong first spine and a soft dorsal behind it; ventrals united. The *C. scolopax* (Linn.) is common in the Mediterranean; it is about five inches long, reddish on the back and sides,

and silvery on the belly, sometimes with a golden tinge; fins grayish white. The food consists chiefly of minute crustacea, which are drawn up the cylindrical beak as water is drawn up the pipe of a syringe, or air up the tube of a bellows, the suction power depending on the dilatation of the throat. Its flesh is considered good. It prefers muddy bottoms, in the neighborhood of seaweeds, in moderately deep water.

BELLOY, Pierre Laurent Buirette de, a French dramatist, born at St. Flour, in Auvergne, Nov. 17, 1727, died in Paris, March 5, 1775. He was educated for the bar, but became an actor at St. Petersburg and other places. His first tragedy, *Titus* (Paris, 1759), failed, and his *Zelmire* (1769) was redeemed only by the acting of Mlle. Clairon; but his *Siége de Calais* (1765) was successful, being the first attempt to dramatize French history. Voltaire joined in the applause of the court and the people, but became an adverse critic after the author's death. His subsequent plays were not equally successful, although his *Gaston et Bayard* (1771) procured for him a seat in the

academy. The cold reception of his *Pierre le Cruel* (1772) gave a shock to his health from which he never recovered. He was in great pecuniary distress toward the close of his life, and Louis XVI. sent 1,000 francs for his relief. A complete edition of his works was published in 6 vols. (Paris, 1779–'87), and a selected edition in 2 vols., with a biographical notice by L. S. Auger (1811).

BELLUNO. **I.** A province of Venetia, Italy, bounded N. and W. by Tyrol, E. by the province of Udine, and S. by Treviso and Vicenza; area, 1,263 sq. m.; pop. in 1871, 175,370. It is situated amid the rugged ramifications of the Trentine and Carnic Alps. The principal river, the Piave, is united by a canal with the Tagliamento. The pasturage on the mountains, the extensive forests, and the rearing of cattle and sheep, and to some extent the production of wine, are the main sources of prosperity. The grain crops are limited, and the mineral wealth, though extensive, is not sufficiently developed. The chief article of export is timber. The province is divided into the districts of Pieve di Cadore, Agordo, Auronzo, Belluno, Feltre, Fonzaso, and Longarone. **II.** A walled city (anc. *Bellunum* or *Belunum*), capital of the province, at the junction of the Ardo with the Piave, 48 m. N. of Venice; pop. about 14,000. The city is built on a promontory and flanked by a precipitous hill, the scenery being remarkably fine. The cathedral, built by Palladio, contains a bust of Pope Gregory XVI., who was born here, and pictures by Bassano and other artists. In front of the Gothic church of St. Stephen is a Roman sarcophagus of the 4th century. There are 12 other churches, two convents, an academy of science and arts, a superior gymnasium, a chamber for commerce and industry, a fine theatre, and an aqueduct 6 m. long. A bishop, formerly called count of Belluno, resides here, and the episcopal chapter or council possess an excellent library. A road leads from the city to the Agordo copper mines. There is an active trade in timber, and silk and other articles are manufactured here. The title of duke of Belluno, conferred on the French marshal Victor, is derived from this town.

BEL-MERODACH. See MERODACH.

BELMONT, an E. county of Ohio, separated from West Virginia by the Ohio river, several affluents of which drain it; area, 520 sq. m.; pop. in 1870, 39,714. The surface is uneven and hilly, and the soil excellent. Coal is found in large quantities. The Central Ohio division of the Baltimore and Ohio railroad, and the Cleveland and Pittsburgh railroad traverse the county. The chief productions in 1870 were 305,205 bushels of wheat, 1,181,615 of Indian corn, 481,803 of oats, 48,763 of barley, 142,569 of potatoes, 1,480,478 lbs. of tobacco, 674,178 of wool, 830,906 of butter, and 69,885 gallons of sorghum molasses; value of orchard products, $129,582. There were 9,207 horses, 7,718 milch cows, 11,883 other cattle, 162,787 sheep, and 22,991 swine. Capital, St. Clairsville.

BELMONT, a village of S. E. Missouri, in Mississippi county, on the Mississippi river, opposite Columbus, Ky. A battle was fought here, Nov. 7, 1861, between the Union forces under Gen. Grant, and the confederates under Gen. Pillow. Columbus was occupied by a strong confederate force under Gen. Polk. On the 6th Gen. Grant with 2,800 men dropped down the river from Cairo to make a reconnoissance toward Columbus. He landed near Belmont, which was occupied by a small body of confederates, who were soon driven from their position. Gen. Polk sent Gen. Pillow with six regiments across the river, and with two others himself undertook to cut Grant off from his transports. Belmont, being commanded by the guns at Columbus, was untenable, and Grant, being greatly outnumbered, fell back toward his transports, repelling several vigorous attacks, and reëmbarked, leaving the enemy in possession of the field. The Union loss was 84 killed, 288 wounded, and 235 missing. The total confederate loss is not officially stated; in four regiments, out of the six actually engaged, it was 65 killed, 187 wounded, and 108 missing.

BELMONTET, Louis, a French poet, born at Montauban, March 26, 1799. He is the son of a Sardinian soldier who gallicized his name of Belmonte and settled in southern France. He early glorified the Bonaparte dynasty, and his ode on the funeral of Napoleon I. (1821) passed through several editions. In Paris he acquired prominence among the followers of Victor Hugo by his poems *Les tristes* (1824), *Le souper d'Auguste* (1828), and by his tragedy, in conjunction with Alexandre Soumet, *Une fête de Néron* (1829), which met with great success and was reproduced in 1861. For a time he supported himself as a teacher in Paris, and though he opposed Louis Philippe, and continued to worship the Napoleons, especially in an ode *L'Empereur n'est pas mort* (1841), he accepted an office from the king, and in 1846 a decoration for his *Nombres d'or* (2d ed., 1855), a didactic poem. From 1852 to 1870 he was a member of the chamber of deputies. He has written biographies of Louis Napoleon and Joseph Bonaparte, and edited the memoirs of Queen Hortense, and has composed over 20 odes in honor of imperialism and its achievements. His other productions include *Le luxe des femmes et la jeunesse de l'époque* (1858), *Lumières de la vie* (1861), and *Poésies des larmes* (1865).

BELOE, William, an English clergyman and author, born at Norwich in 1756, died April 11, 1817. He studied under Dr. Parr and at Cambridge university, for a time assisted Dr. Parr in a school at Norwich, and was afterward curate and vicar of Eltham. Finding his income insufficient, he removed to London, and for several years occupied himself by writing for periodicals. During the American revolution he advocated with his pen the cause of the colonies, but when the French revolution

broke out he took the conservative side; and in company with Archdeacon Nares he commenced in 1793 the publication of the "British Critic," which strongly supported tory views. In 1804 he became assistant librarian of the British museum, but was soon dismissed on account of a loss sustained by the institution through his mistaken kindness to an unworthy applicant. He made a translation of Herodotus (4 vols. 8vo, 1791) which had for a time a high reputation, but has been superseded by more accurate versions. Besides many other translations, he published "Anecdotes of Literature and Scarce Books" (6 vols. 8vo, 1806–'12), and other works; and after his death appeared "The Sexagenarian, or Memoirs of a Literary Life" (2 vols. 8vo, 1817).

BELOIT, a city of Rock county, Wis., situated on both sides of Rock river, at the mouth of Turtle creek, near the southern boundary of the state, 65 m. S. W. of Milwaukee; pop. in 1870, 4,396. It is built on a beautiful plain, from which the ground rises abruptly to a height of 50 or 60 feet, affording excellent sites for residences. It is the seat of Beloit college, founded in 1847, which is under the control of the Congregationalists, and in 1871 had 9 instructors, 133 students in the preparatory and 64 in the academic department, and a library of 7,200 volumes. The city is noted for its broad, handsome streets, and for its fine churches; the Congregational church, constructed of gray limestone, is considered one of the most beautiful in the state. Beloit is well supplied with water power, has a flourishing trade, and contains several manufactories of woollen goods, of reapers and fanning mills, of scales, of carriages, an iron foundery and machine shop, several flouring mills, 2 newspaper offices, several hotels, a bank, a high school, and 4 grammar and 8 primary schools. It is the point of intersection of the Chicago and Northwestern and the Western Union railroads. A fertile prairie, the largest in the state, lies on the E. side of Rock river. Beloit was settled about 1837, and incorporated as a city in 1856.

BELON, Pierre, a French naturalist, born at Soulletière, in the province of Maine, about 1517, assassinated in Paris in April, 1564. His early studies in natural history were facilitated by the bishop of Mans, and he graduated as doctor of medicine in Paris, where he became acquainted with Ronsard and other learned men. On his return from Germany, where he had travelled with the botanist Cordus, he was arrested for alleged conversion to the doctrines of Luther. He made three journeys to the East and other countries (1546–'9), and a pension was conferred on him by Henry II., and a residence in the château de Madrid, in the Bois de Boulogne, by Charles IX. Late one evening he was found dead in the wood, having probably been killed by robbers. He is considered as the founder of the science of comparative anatomy. His principal work, *Observations de plusieurs singularitez et choses memorables, trouvées en Grèce, Asie, Judée, Égypte, Arabie et autres pays estranges* (in 3 parts, Paris, 1553), passed through several editions, and was translated into Latin and German. Among his other writings are: *Histoire naturelle des estranges poissons marins* (1551), *Histoire de la nature des oyseaux* (1553), and *Les remonstrances sur le default du labour et culture des plantes,* &c. (1558).

BELOOCHISTAN, or **Beloojistan,** a country of Asia, between lat. 24° 50′ and 30° 20′ N. and lon. 57° 40′ and 69° 18′ E., bounded N. by Afghanistan, E. by Sinde, S. by the Indian ocean, and W. by Persia; area, about 166,000 sq. m.; pop. about 2,500,000. The general aspect of the country is mountainous; but toward the shore of the Arabian sea on the south, and toward Persia on the west, there are extensive barren plains. The Hala mountains on the east and northeast, running from the mouths of the Indus to the Solyman mountains, include a quantity of comparatively fertile land, of valley and upland plain, in which the inhabitants raise tropical grains and fruits. A strip of territory to the east of the Hala chain, which, although within the Indus valley, belongs to Beloochistan, is very fertile, producing cereals and rich crops of jowarree (a grain much in demand in northern India), and various tropical productions. But the land here is low and swampy, to which indeed it owes its fertility, and, though more numerously inhabited than the other regions, is the most unhealthy of the whole. The remainder of the country is a barren wilderness. On the N. E. boundary are situated the famous mountain passes, the Bolan and Gundwana. These form the direct road to Kelat, the capital, and the only means of communicating with the interior of the country, from the plains of N. W. India. There are no rivers worthy the name; a few mountain brooks attain considerable size in the spring, but do not endure; and the streams emptying from the southern coast into the sea are insignificant. The northeastern and eastern provinces or districts are Sarawan, Kelat, Cutch-Gundava, and Jhalawan. On the south along the seashore are the district of Loos and Mekran, the ancient Gedrosia. In the northwest are Kohistan and Kalpoorakan.—The inhabitants of Beloochistan consist of two great varieties, the Belooches and the Brahooees, which are subdivided into other tribes, and these again into families. Their origin is uncertain, but they are probably a race of mixed Tartar and Persian descent. They themselves claim to belong to the earliest Mohammedan conquerors of central Asia, and are zealous Sunnis, tolerating an unbeliever rather than a Shiah. Polygamy is allowed. In their nomadic habits they resemble Tartars or Bedouins, living in tents of felt or canvas, and wearing a woollen cloth on their heads, with woollen or linen outer coats. They are of slight but active forms, and practise arms and warlike exercises for amusement. Their wo-

men enjoy considerable freedom. The Brahooees speak a dialect resembling those of the Punjaub, and are shorter and stouter than the Belooches. They are somewhat less addicted to rapine and plunder than the others, and are said to be hospitable and observant of promises. The government is under various heads, of whom the khan of Kelat is leader in time of war, and a kind of feudal chief in peace.—Beloochistan was formerly subject to Persia and afterward to Afghanistan, but in the latter part of the last century the tribes shook off their dependence on the Afghans. At the time of the British expedition into Afghanistan the British forced the Bolan pass. The Belooches harassed the troops considerably; and in 1840 an expedition was sent against Kelat to chastise them, which was done effectually, but no permanent occupation was made.

BELPER (formerly *Beaupoire*), a town of Derbyshire, England, on the Derwent and the Midland railway, 7 m. N. of Derby; pop. in 1871, 11,156. It is well built, and one of the most flourishing towns of Derbyshire. The Strutt cotton works employ over 2,000 persons, and there are also manufactories of silk and cotton hosiery, nails, and brown earthenware.

BELSHAM. I. Thomas, an English Unitarian divine and author, born at Bedford in April, 1750, died at Hampstead, Nov. 11, 1829. He was educated at the dissenters' academy at Daventry, of which he was principal from 1781 to 1789, also preaching at Daventry. In 1789 he embraced Unitarianism, and after spending nearly 11 years as pastor of the Gravel Pit congregation, he was called to the metropolis, and settled in 1805 as pastor of Essex street chapel, London, where the remaining 24 years of his life were spent. Mr. Belsham wrote a great deal in assertion and vindication of Unitarianism, including "Evidences of the Christian Revelation," a "Translation of the Epistles of Paul the Apostle, with an Exposition and Notes," and a reply to Mr. Wilberforce's "Practical View." Among his contributions to general literature, his "Elements of the Philosophy of the Human Mind and of Moral Philosophy" (London, 1801), in which, with David Hartley, he resolves all mental phenomena into the association of ideas, is best known. **II. William,** a historical writer, brother of the preceding, born at Hammersmith in 1752, died Nov. 17, 1827. He was a whig in politics, and well acquainted with the leaders of that party. In 1789 he commenced his literary course by publishing "Essays, Historical, Political, and Literary" (2 vols.). To these succeeded essays on various subjects, chiefly political, and several works which appeared between 1793 and 1801, and were finally reproduced in a collective edition as a "History of Great Britain to the Conclusion of the Peace of Amiens" (12 vols. 8vo, 1806).

BELSHAZZAR (Chal. *Belshatztzar*). See Babylon.

BELSUNCE, or Belzunce, Henri François Xavier de, a French Jesuit, born at Périgord, Dec. 4, 1671, died in Marseilles, June 4, 1755. At an early age he became a Jesuit, was made grand vicar of Agen, and in 1709 bishop of Marseilles. During the pestilence which devastated his see in 1720–'21, Belsunce displayed charity and unselfishness to a degree that drew upon him the encomiums of all Europe. He is especially referred to in Pope's "Essay on Man." In consideration of his services at this period, he was offered the bishopric of Laon, and also the archbishopric of Bordeaux, but refused both. He was, however, the recipient of many honors, both from the pope and the king. In his later years he became involved in disputes with the Jansenists, whom he attacked with much zeal in various writings. He founded a Jesuit college which bears his name.

BELT, Great and **Little,** the name given to two of the three channels which connect the Baltic with the Cattegat, and through it with the North sea. The Great Belt is about 50 m. long, 18 m. in medium width, and from 6 to 26 fathoms deep. It lies between the islands of Seeland and Fünen, the shores of which present no striking features, but are lined with safe harbors. Navigation is difficult at all seasons on account of many dangerous shoals and sand banks, and in winter it is still further obstructed by floating ice, though the swiftness of the current prevents the strait from being often frozen over. Lighthouses have been erected on the shores; and on the small island of Sprogö, which lies in the middle of the channel, and which the action of the waves is gradually wearing away, there is, besides a light, a small building for the shelter of crews of such small vessels as may be icebound in the attempt to pass through the strait.—The Little Belt separates Fünen from Schleswig and Jutland. It is also about 50 m. long, from 1,000 yards to 12 m. wide, and from 5 to 30 fathoms deep. The shores are low and regular, and the current rapid. It is frozen over from December to April, and navigation at other seasons is attended with the same dangers as in the Great Belt. Large vessels usually pass through the Sound, which is the only channel except the Belts between the Cattegat and the Baltic.

BELTANE, or Beltein, a kind of festival, still celebrated in parts of Ireland and Scotland on the 1st of May, and supposed to be as old as the remotest period of druidical supremacy. The name signifies the fire of Bel or Baal, and the custom was probably an offshoot and remnant of oriental worship. To the Beltane may be referred the practice of lighting fires on midsummer eve in England, in honor of the summer solstice.

BELTIS, or Bilit, a goddess of the Babylonians. See Mylitta.

BELTRAMI, a N. W. county of Minnesota; pop. in 1870, 80. Red lake in the N. W. part discharges into the Red river of the North, and

several lakes in the west discharge into Wild Rice river, which flows into the Red. Itasca lake, about 1,600 ft. above the level of the sea, in the S. part of the county, is the source of the Mississippi river, which in its course through the county forms several lakes, the largest being Cass lake, on the S. E. border. Leech lake, a large body of water touching the S. E. corner, also flows into the Mississippi.

BELUR TAGH. See BOLOR TAGH.

BELUS (Heb. *Bel;* Gr. Βῆλος), the Græcized form of the Chaldee Bel, as given in the Hebrew Scriptures, or Bil, as read in the inscriptions, the name or title of one of the principal Babylonian divinities. The name Bel is supposed to be contracted from *Beel*, a Chaldee equivalent of the Phœnician and Hebrew *Baal* (the Lord). (See BAAL, BABYLONIA, and MERODACH.) The attending female divinity was Bilit or Mylitta. (See MYLITTA.) The Greeks adopted Belus among their divinities, making him the son of Neptune, and the ancestral hero and national divinity of several eastern nations.

BELUS, Temple of. See BABEL, and BABYLON.

BELZONI, Giovanni Battista, an Italian traveller and explorer, the son of a barber, born in Padua about 1778, died in Africa, Dec. 3, 1823. He was educated for monastic life; but the French revolution broke up this design, and after wandering for some time about the continent, he went to England in 1803. Here he at first gained a precarious subsistence by exhibiting as an athlete at Astley's circus, being endowed with prodigious strength. To these feats were added scientific experiments, as he had paid much attention to natural philosophy, particularly to hydraulics. He married in England, and after residing there for nine years visited Portugal, Spain, and Malta. Conceiving the idea of offering his services to the pasha of Egypt in constructing water wheels to irrigate the fields contiguous to the Nile, he arrived in Egypt June 9, 1815. He first constructed for the pasha one of his hydraulic machines, at the gardens of Subra, three miles from Cairo. Mehemet Ali himself appears to have been satisfied with it, but the cultivators regarded it as an innovation, and their prejudices obliged Belzoni to abandon his scheme without even being rewarded by the pasha. His curiosity being now strongly excited on the subject of Egyptian antiquities, at the recommendation of Burckhardt he was employed by Mr. Salt, the English consul, to remove the colossal head, generally but incorrectly styled the young Memnon. This Belzoni successfully accomplished, in the face of great difficulties, transporting it to Alexandria, and thence shipping it for England. In the mean time he made excursions to the mountain of Gornoo, to Asswan and Philæ, and at Ipsambul he was the first to open the great temple which had been discovered by Burckhardt. In 1817 he made a second journey to Upper Egypt, and became involved in a quarrel with Drovetti, the French consul, and his coadjutor the count de Forbin. He visited the necropolis of Thebes, and made excavations at Karnak. Belzoni also discovered another colossal head of granite, which is now in the British museum, and, in the valley of Bibanul-Moluk, the most perfect of known Egyptian tombs, a model of which, exhibited by him in London in 1821, attracted crowds of visitors. Before leaving Egypt he succeeded in 1818, after much trouble, in exploring the second of the great pyramids of Gizeh, that of Chephren or Sephres. This, ever since the time of Herodotus, was believed to be without internal chambers. After 30 days of persevering labor, Belzoni found the entrance, and penetrated to the central chamber. He also visited the district of Fayoom, the oasis of Jupiter Ammon, and Lake Mœris, and discovered the ruins of Berenice. He left Egypt in September, 1819, and visited his native city of Padua, where a medal was struck in his honor; and on his return to England he published a "Narrative of the Operations and recent Discoveries within the Pyramids, Temples, Tombs, and Excavations in Egypt and Nubia" (3d ed., 2 vols. 8vo, London, 1822). In 1823 he formed the design of penetrating to Timbuctoo in Africa, and had reached the bight of Benin, but was attacked with dysentery, of which he died at a small place in Benin.

BEM, Józef, a Polish general, born at Tarnow, Galicia, in 1795, died at Aleppo, Dec. 10, 1850. At an early age he entered the corps of cadets at Warsaw, and received his military training at the artillery school directed by Gen. Pelletier. On leaving this school he was appointed lieutenant of the horse artillery, served in that capacity under Davoust and Macdonald in the campaign of 1812, won the cross of the legion of honor by his coöperation in the defence of Dantzic, and after the surrender of that fortress returned to Poland. As the czar Alexander now affected a great predilection for the Polish nation, and reorganized the Polish army, Bem entered the latter in 1815 as an officer of artillery, but was soon dismissed for fighting a duel with a superior; but he was subsequently appointed military teacher at the artillery school of Warsaw and promoted to the rank of captain. He now introduced the use of the Congreve rocket into the Polish army, recording the experiments made in a volume originally published in French. He was insubordinate, and from 1820 to 1825 was several times arraigned before courts martial, punished with imprisonment, and at last sent to Kock under strict police surveillance. He did not obtain his discharge from the Polish army until the death of Alexander and the Petersburg insurrection made Constantine lose sight of him. Leaving Russian Poland, he now retired to Lemberg, where he became an overseer in a large distillery, and wrote a book on steam applied to the distillation of alcohol. When the Warsaw insurrection of 1830 broke out he joined it, after a few months was made

a major of artillery, and in June, 1831, took part in the battle of Ostrolenka, where he was noticed for the skill and perseverance with which he fought against the vastly superior Russian batteries. When the Polish army had been finally repulsed in its attacks against the Russians who had passed the Narew, he covered the retreat by a bold advance. He was now created colonel, soon after general, and called to the command-in-chief of the Polish artillery. After the fall of Warsaw, in the defence of which he took part, he crossed the Prussian frontier with the rest of the army, but urged the men not to lay down their arms before the Prussians, and thus provoked a bloody collision, called at that time the battle of Fischau. He then abandoned the army and organized in Germany committees for the support of Polish emigrants, after which he went to Paris. Travels through Portugal, Spain, Holland, Belgium, and France absorbed his time during the period from 1834 to 1848. On the first appearance in March, 1848, of revolutionary symptoms in Austrian Poland, he hastened to Lemberg, and thence, on Oct. 14, to Vienna, which had risen in insurrection on the 6th. But he in vain exerted all his energy in organizing the insurgents. After a remarkable defence, Oct. 28, 1848, of the great barricade erected in the Jägernzeile, and after the opening of negotiations between the Vienna magistrates and Prince Windischgrätz, he disappeared, secretly escaping to Pesth. The revolutionary Hungarian government gave him command of Transylvania. Opening the first campaign toward the end of December, 1848, with a force of about 8,000 ill-organized and badly armed men, he finished it in about three months, having vanquished Puchner with an Austrian army of 20,000, Engelhardt with an auxiliary force of 6,000 Russians, and Urban with his freebooters. But during the next summer the war was renewed by the Russians, and, after desperate fighting on the part of Bem and his army, was terminated disastrously for them by the decisive battles of Schässburg (July 31, 1849) and Temesvâr (Aug. 9), which were speedily followed by the surrender of Görgey. After a vain attempt to make a last stand at Lugos and in Transylvania, he was compelled to take refuge in the Turkish territory. With the purpose of opening to himself a new field of activity against Russia, Bem embraced the Mussulman faith, and was raised by the sultan to the dignity of a pasha, under the name of Amurath, with a command in the Turkish army; but, on the remonstrances of the European powers, he was relegated to Aleppo. Having there succeeded in repressing some sanguinary excesses committed in November, 1850, on the Christian residents by the Mussulman populace, he died about a month later, of a violent fever, for which he would allow no medical aid.—His publications include *Exposé général de la méthode mnémonique polonaise*, &c. (Paris and Leipsic, 1839), part of which work served as a basis for the "Polish-American System of Chronology," by Miss Elizabeth P. Peabody (New York, 1852).

BEMAN, Nathaniel S. S., an American clergyman, born at New Lebanon, N. Y., in 1785, died at Carbondale, Ill., Aug. 8, 1871. He graduated at Middlebury college in 1807, studied theology, and about 1810 was ordained pastor of a Congregational church in Portland, Me. Two or three years later he went as a missionary to Georgia, where he devoted himself especially to the work of establishing educational institutions. In 1822 he became pastor of the first (and at that time the only) Presbyterian church in Troy, N. Y. He retained the charge of this church more than 40 years, and became a leading member of his denomination, entering warmly into the temperance, moral reform, revival, and anti-slavery movements of his time. In 1831 he was moderator of the general assembly of the Presbyterian church; and during the discussions which in 1837 led to the disruption of that church he was the leader of the New School branch. In 1863 he resigned the pastoral office, and for the remainder of his life resided in Troy or with his daughter in Illinois. Dr. Beman was among the most cultivated scholars and eloquent preachers of the American church. Many of his sermons, addresses, and essays have been separately printed; he also published a volume containing "Four Sermons on the Atonement," and was, by appointment of the general assembly, one of the compilers of the hymn book adopted by the New School branch of the Presbyterian church.

BEMBO. I. Bonifazio, an Italian painter, born at Valdarno, was employed by the court of Milan about the middle of the 15th century. He assisted in the decoration of the cathedral of Cremona, where he painted the "Purification" and the "Adoration of the Magi." His works are esteemed for their brilliant coloring, bold attitudes, and splendid drapery. **II. Giovanni Francesco,** brother and pupil of the preceding, a painter of the Cremonese school, who of all his contemporaries departed furthest from the antique manner, and resembles Fra Bartolommeo in coloring.

BEMBO, Pietro, an Italian cardinal and author, born in Venice, May 20, 1470, died in Rome, Jan. 18, 1547. He was of a noble family, and at an early age studied at Florence, whither his father was sent as ambassador, and afterward at Messina, whence he returned in 1494 to his native city. Soon after he wrote a treatise upon Mount Etna, which was his first publication. He then frequented the courts of Ferrara and Urbino, pursuing philosophical and literary studies, and admired for his wit and graceful manners. Learning and letters were then in the highest esteem in the noble families of Italy, and Bembo had many powerful patrons, received favors from Pope Julius II., and accompanied his friend Giovanni de' Medici on his way to Rome to be crowned pope as Leo

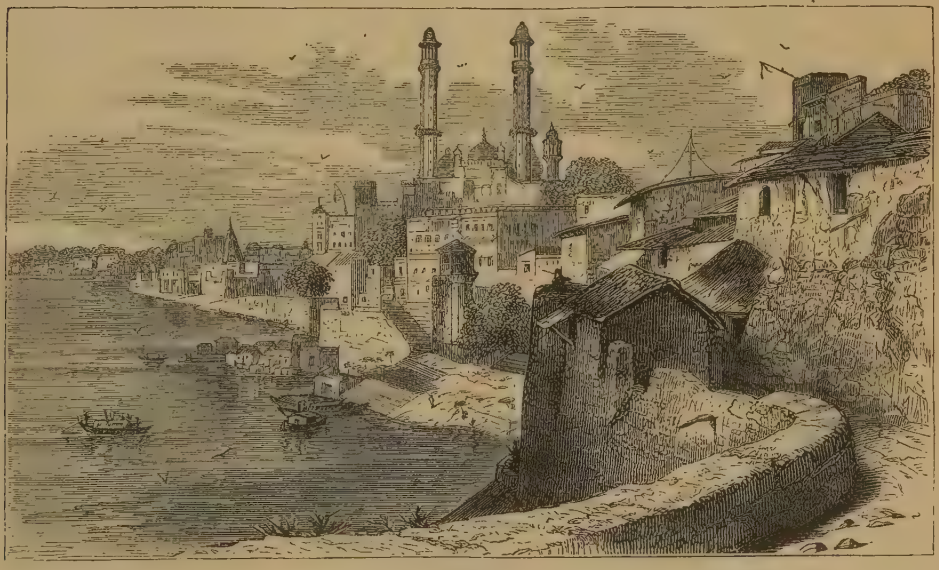
X. He was made secretary to the new pope, enjoyed the acquaintance of many distinguished men, and busied himself with composition. The beautiful Morosina, whom he loved, and who bore him three children, persuaded him upon the death of Leo X. in 1521 to retire from public affairs, and to spend the rest of his life in literary elegance at Padua. Here he formed an extensive library and collection of medals, and enjoyed the society of his learned friends. He sometimes visited Rome, and having become a cardinal after the accession of Paul III., he determined to embrace another manner of life. He renounced profane letters, studied the fathers and theologians, was advanced to several bishoprics, and died in sentiments worthy of a prince of the church. His writings, consisting of letters, poems, dialogues, criticisms, fragments, and a history of Venice, are distinguished for elegance and gracefulness of style.

BEN, the Hebrew and Arabic word for son, often used in forming complements of names; thus: Shelomeh ben David (Solomon son of David), Mosheh ben Maimon (Moses Maimonides), Ali ben Hassan. In Arabic, and after it in mediæval Hebrew, the form *ibn* is used in the same way, being in rabbinical names often changed into *aben*. The qualifying names with the prefixed *ben*, &c., are also used independently, thus: Ibn Batuta, Ibn Ezra, Ben Gabirol, Bendavid; like the similar modern names Jacobson, Mendelssohn, and Davison.

BENALCAZAR, Sebastian de, the first conqueror of Popayan, New Granada, born about the end of the 15th century at Benalcaz, in Estremadura, Spain, died in 1550. He set out as a common sailor in the train of Pedrarias, the newly appointed governor of Darien, in 1514. His ability and daring gained for him the confidence of Pizarro, who sent him against the Indian leader Ruminahui. At the moment of engagement the volcano of Cochabamba suffered an eruption, at which the Peruvian army was more frightened than the Spaniards, and fled to Quito. Sebastian then possessed himself of the smoking ruins of this city. Thence he passed northward and overcame Popayan, a chief whose name he transferred to the conquered territory. Inflamed by the speeches of an Indian captive, who spoke of a chief further north who was anointed with gold powder, Benalcazar and his band determined to visit and conquer this *el dorado*, or "golden one." After traversing vast forests, he arrived in 1534 in the country afterward called New Granada, but found himself forestalled by two other Spanish adventurers. He returned to Popayan, and was made governor of that province by a decree dated 1538. But when La Gasca succeeded in supplanting Diego Pizarro, he deprived Benalcazar of his governorship, and the chagrin he felt at this slight is said to have caused his death.

BENARES, a city of British India, celebrated as the ecclesiastical capital of the Hindoos, situated on the left bank of the Ganges, 390 m. N. W. of Calcutta, and 75 m. E. of Allahabad, in lat. 25° 19′ N., lon. 82° 55′ E.; pop. about 200,000. It is the metropolis of a district of the same name which forms a part of the Northwest Provinces. Although so far inland, the altitude of Benares above the sea level is only about 300 ft. The city extends over three miles along the Ganges, and one mile from it. A bridge of boats crosses the river to the railway station on the opposite bank. The width of the Ganges here varies with the season, sometimes exceeding half a mile. The ascent from the river margin to the city is very steep, and is for the most part occupied by long and handsome flights of broad stone steps, called ghauts. These terraces are the favorite resort of the Hindoos in all their outdoor pursuits. Above them rise the palaces, mosques, towers, and temples of the city, which as seen from the Ganges, in their massive and gorgeous architecture, present a striking and impressive picture of oriental grandeur. The interior of Benares, however, is by no means so attractive, the houses being high and closely built, with no streets wide enough to permit the passage of carriages. The loftier and better class of dwellings are built of brick, and have an interior courtyard; but many of the houses are simply cabins of dried mud roofed with tiles. Benares has been appropriately termed the Mecca of the Hindoos. A true Brahman regards it as the holiest spot on earth, and believes that future blessedness is secure to the worst of men who is fortunate enough to die within its precincts. Hundreds of invalids are brought here to be sanctified by so enviable a death. Even the water of the sacred Ganges is holier here than elsewhere, and quantities of it are taken from the ghauts and conveyed by pious pilgrims to every part of India. Along the terraced riverside fires are continually burning, on which smoulder the bodies of the recent dead. The sacred Brahman bulls roam in large numbers through the narrow streets at will, frequently disputing the right of way with foot passengers. There are not fewer than 1,000 Hindoo temples in the city. The golden temple of Shiva, the reigning deity of Benares, is one of the most celebrated, but is neither very beautiful nor attractive. The Doorgha Kond, the famous temple of the sacred monkeys, although ostensibly devoted to the worship of the goddess Doorgha, is in reality the dwelling of swarms of large yellow monkeys, who overrun a quarter of the city. They are maintained and carefully tended by the Brahmans, who imagine them to possess certain holy attributes. The temple overlooks one of the finest tanks in India. The Hindoos are the dominant race in Benares, constituting nine tenths of the entire population. On important religious occasions throngs of pilgrims, sometimes to the number of 100,000, come from all parts of Hindostan to visit the holy city. The Mohammedan mosques in Be-

nares number more than 300, that built by Aurungzebe in the 17th century being the most prominent. It occupies the site of an ancient Hindoo temple in the centre of the city. Its 28 minarets rise each 232 ft. above the surface of the Ganges, the foundations extending to the water's edge. The architecture of the building is variously described as beautiful and unattractive. The observatory of Jai Singh, established during the Mogul supremacy, is a massive structure, furnished with curious astronomical instruments and ancient oriental drawings of the celestial heavens. A Hindoo Sanskrit college was founded in 1792, to which an English department was added in 1832, providing instruction in mathematics, history, belles-lettres, and political economy. There are other Hindoo and Mohammedan schools, and several foreign Christian missions. A court of civil and criminal justice is maintained by the British government. Secrole, the English settlement containing the official residences and cantonments, lies between 2 and 3 m. W. of the native town. It is an unhealthy station and much dreaded by European troops. The manufactures of Benares comprise cottons, woollens, silks, and magnificent gold brocades. The city is the centre of a large provincial trade in fine shawls, muslins, and diamonds, which articles, in addition to its own manufactures, form the principal exports. It is also a great mart of distribution for European goods.—The modern city of Benares dates from the period of Mohammedan ascendancy in the latter part of the 17th century, but the ruins found in the vicinity indicate a much earlier origin. The Hindoos believe Benares to have been founded at the creation of the world. It



Benares.

is noteworthy that three great religions have flourished there: Buddhism, the founders of which there began to propagate their faith; Mohammedanism, which was temporarily dominant; and Brahmanism, which has regained its supremacy.—The district of Benares has an area of about 1,000 sq. m. and a population of about 800,000. It is abundantly watered by the Ganges, Goomtee, and many smaller streams. The climate is characterized by violent extremes of temperature, with a mean of 77° F., and an annual rainfall of more than 30 inches. The country is fertile and well cultivated, producing abundant crops of sugar, opium, and indigo. It was ceded to the East India company in 1775 by the king or nawaub of Oude, who acquired it after the destruction of the Mogul empire. On an agreement providing for the payment of certain tribute, the East India company in 1776 granted the district to Rajah Cheyt Singh. This agreement was broken by Warren Hastings as governor general, and its violation was the subject of one of the charges on which he was subsequently impeached.

BENBOW, John, an English admiral, born at Newport in 1650, died in Jamaica, Nov. 4, 1702. He was reared in the merchant service, and in a trip to the Mediterranean in 1686 he fought so desperately against an African corsair, that he was invited to the Spanish court by Charles II., who recommended him to James II. of England. The latter gave him the command of a ship of war to protect British interests in the English channel, and subsequently he was promoted to the rank of rear admiral, and employed in blockading and bombarding the French ports. In 1701, with a squadron under his command, he sailed to the

West Indies. His success was commended by the house of commons, and in 1702, on a second expedition, he encountered the French fleet under Ducasse, and for five days maintained a running fight with them. He succeeded in bringing the enemy's sternmost ship to close quarters, but his chief officers refused to second his efforts. Here he lost a leg by a chain-shot, an event which, though it did not abate his ardor, gave occasion for some of his captains to agree "that nothing more was to be done." On his return to Jamaica he brought the delinquents before a court martial, which convicted them of disobedience and cowardice, and caused them to be shot. His wound, and the emotion caused by these events, concurred with a pulmonary disease to hasten his death.

BENCOOLEN (Malay, *Bangka Ulu*, rolling uplands). **I.** A Dutch residency on the S. W. coast of Sumatra; area, including the island of Engano, 8,736 sq. m.; pop. about 100,000. The surface is hilly and undulating. The soil is inferior to that of the eastern slope of the island; it is for the most part a stiff red clay, burnt nearly to the state of a brick where it is exposed to the sun. The chief culture was pepper during the first intercourse of Europeans with this country. In 1798 the clove and nutmeg were introduced from the Moluccas; but the latter alone has succeeded, and that only by manuring and much labor and care. Some of the forests abound in *gutta percha* and *gutta taban* trees, which produce a gum of excellent quality. Coffee is cultivated to considerable extent. The *styrax benzoin* tree, from which the gum benjamin of commerce is obtained, is grown in plantations. The buffalo and goat are the only large animals domesticated. Tigers are very numerous, and materially impede the prosperity of the country. The Rejangs, one of the most civilized races of Sumatra, compose the greater portion of the population of this territory. **II.** The chief town of the residency, in lat. 3° 47′ S., lon. 102° 19′ E.; pop. about 10,000. The British East India company established a factory at this point for the pepper trade in 1685. In 1714 Fort Marlborough was founded, 3 m. distant. In 1760 the French under Count d'Estaing captured and took possession of the fort and factory; but they were restored to the company by the treaty of Paris in 1763. By the treaty of London in 1824, the English government ceded the fort and factory, and establishments dependent on them, which then embraced a territory of about 12 sq. m., to the Dutch, in exchange for Malacca and its territory, and a small post near Madras. Bencoolen was an unprofitable dependency of the Bengal presidency, and cost the East India company, on an average, about $60,000 per annum during the whole period of its possession; it was maintained partly from a point of honor, but chiefly on account of an over-estimate of the advantages expected to grow out of the pepper trade. During the English possession the town contained 20,000 inhabitants, but has now dwindled to one half that number, composed of Rejangs, Malays, Bughis, and a large number of Arabs and Chinese. A Dutch assistant resident is stationed there.

BENDA. I. Franz, a German violinist, born at Old Benatek, in Bohemia, in 1709, died at Potsdam in 1788. He acquired an extraordinary mastery of the violin, receiving his first lessons from a blind musician in a band of strolling players. In 1732 he entered the service of Frederick the Great, then prince royal, with whom he remained the rest of his long life. He founded a school of violinists, whose method of playing was original and effective. He also published some excellent solos for the violin. **II. Georg,** a composer, brother of the preceding, born in Bohemia in 1721, died at Köstritz in 1795. He passed many years of his life as a musician in the service of the courts of Prussia and Gotha, and improved his style by a visit to Italy. He composed a number of comic operas, and two of a serious character entitled "Ariadne in Naxos" and "Medea," which are written with much feeling and taste. Besides his operas, Benda wrote some excellent sonatas for the harpsichord.

BENDAVID, Lazarus, a German philosopher and mathematician, of Jewish parentage, born in Berlin, Oct. 18, 1762, died there, March 28, 1832. A glass-cutter by trade, he attained great proficiency in mathematics, and the highest praise was awarded by Kästner to his first published disquisition in 1785, *Theorie der Parallelen*, followed in 1789 by *Das mathematische Unendliche*. After lecturing in Berlin and studying in Göttingen, he delivered in Vienna for about four years lectures on Kantian philosophy and æsthetics which he afterward published. Persecuted in Vienna, he returned to Berlin in 1797, and spent the rest of his life there, engaged in lecturing and literary labors, and in presiding over the Jewish free school, which under his direction rose to great excellence. His works include *Vorlesungen über die Kritik der reinen Vernunft* (Vienna, 1795; 2d ed., Berlin, 1802); *Versuch über das Vergnügen* (2d ed., Vienna, 1794); *Versuch einer Geschmackslehre* (Berlin, 1798); *Versuch einer Rechtslehre* (1802); *Ueber den Ursprung unserer Erkenntniss* (a prize essay, 1802); *Ueber die Religion der Ebräer vor Moses* (1812); and *Zur Berechnung des jüdischen Kalenders* (1817).

BENDEMANN, Eduard, a German painter, of the Düsseldorf school, born in Berlin, Dec. 3, 1811. He is the son of a Jewish banker, and was a pupil of Schadow, who had a very great influence upon his style, and led him to adopt many characteristics exhibited in nearly all his paintings. Bendemann was only 21 years of age when his first great picture, "The Mourning Jews," acquired for him a lasting celebrity. In 1838 he was made professor at the academy of art in Dresden. He was also chosen to decorate with frescoes the principal rooms of the

royal palace there; and the paintings he executed are among the best of his works. In 1859 he was made director of the academy at Düsseldorf, which position he still holds (1873). He has produced a very great number of remarkable and celebrated works, besides the frescoes with which he has decorated public buildings in Germany.

BENDER (Russ. *Bendary*), a fortified town of Russia, capital of a district in the province of Bessarabia, on the right bank and about 48 m. from the mouth of the Dniester, 35 m. S. E. of Kishenev; pop. in 1869, 24,443, including Jews, Russians, Tartars, Armenians, and Moldavians. The town is partly built in the shape of a crescent, and is separated from the strong citadel, which stands on an eminence, by a large space with a mound, called after Suvaroff. There are seven gates and several suburbs, and the small houses and numerous hovels extend far into the surrounding steppe. The streets are dirty and gloomy, and the town generally has an oriental aspect, enhanced by many mosques, which with one exception are now appropriated to secular purposes. The natives are mostly occupied in agriculture and grazing. Saltpetre, leather, and paper are manufactured to some extent. The Russians are the most industrious. The chief language is Roumanian. The transit business with Odessa, Jassy, and other places is very active, the principal trade being in grain, wine, wool, cattle, tallow, and timber.—The Genoese had a settlement here as early as the 12th century, but the town does not seem to have been thoroughly established till the 14th century. In the 16th it passed with Moldavia into the hands of the Turks, who built the fortifications. After the battle of Poltava (July 8, 1709) Charles XII. escaped to Bender, and was permitted by the Turkish authorities to reside for several years in the neighboring village of Varnitza. The Russians under Panin stormed and burned the town Sept. 26, 1770, and massacred the garrison and the inhabitants, killing about 30,000. The treaty of peace of 1774 restored the town to Turkey. It was again taken by the Russians under Potemkin, Nov. 15, 1789; but the Turks were once more reinstated till 1806, when Meyendorff retook the place, and in 1812 it was by the treaty of Bucharest united to Russia together with the rest of Bessarabia.

BENDISH, Bridget, the granddaughter of Oliver Cromwell of England, and the daughter of Gen. Ireton, born about 1650, died in 1727. In her early years she lived at Cromwell's court, and was present at the audiences he gave to foreign ambassadors. She bore a wonderful resemblance to the protector, physically and morally; her energy was immense; she would work for days together without sleeping; had uncommon conversational powers; was liable to periodic attacks of religious ecstasy; and managed her salt works at Southtown, in Norfolk, with great exactness. She could never bear to hear her grandfather evil spoken of, and one day when travelling in the stage coach a tory squire so committed himself, not knowing in whose presence he was; she jumped out at the next stage, snatched a sword from another fellow passenger, and challenged the royalist gentleman to a duel. She would sometimes drive her carriage into Yarmouth, and spend an evening at the assembly rooms in that city, where her princely manners, venerable aspect, and imposing energy of voice and manner recalled the protector. A memoir of her by a local physician has been preserved, and translated into French by Guizot.

BENEDEK, Ludwig von, an Austrian soldier, born at Oedenburg, W. Hungary, in 1804. He is the son of a physician, studied at the military academy of Neustadt, near Vienna, entered the army as a cornet in 1822, and rose to the rank of lieutenant colonel in 1843. He fought against the insurgents in Galicia in 1846, against the Italians in 1848, and in 1859 commanded at Solferino the left wing of the Austrian army, which was the last to leave the field. In 1860 he became field marshal and governor general of Hungary, in November of the same year commander-in-chief in Italy, and in 1866 in the war with the Prussians, by whom he was crushingly defeated at Sadowa, July 3. He was superseded by the archduke Albert, under whom he served till October, when he was put on the retired list, his disastrous generalship against the Prussians destroying his reputation.

BENEDETTI, Vincent, count, a French diplomatist, born in Corsica about 1815. He is of Greek origin, and the husband of a wealthy Greek lady, was French consul in Cairo and Palermo, secretary of legation in Constantinople, director of the political department in the ministry of foreign affairs, and secretary during the negotiation of the treaty of Paris (1856). His acquaintance with Count Cavour led to his being sent in 1860 to Turin to negotiate the final cession of Savoy and Nice to France; and he was ambassador there in 1861–'2. In 1864 he was appointed ambassador to Berlin, and was made a count in 1869. In 1870 he was ordered to protest against the candidature of Prince Leopold of Hohenzollern for the throne of Spain. The Prussian cabinet rejected this protest July 4, upon which Benedetti appealed in person to the king of Prussia at Ems on July 9, and again on July 11, but the king declined to interfere. The prince of Hohenzollern voluntarily withdrew from the candidature July 12. Benedetti was nevertheless instructed to insist upon King William's apologizing to Napoleon III. for having sanctioned it, and upon his pledging himself against its renewal; and although Count Bismarck declined to entertain this demand, the French envoy importuned the king personally in the public walks at Ems July 13, in a manner so displeasing that he was informed that no further interviews would be granted to him. He thereupon left Ems (July 14) for Paris, and war

against Prussia was virtually declared on the following day by a resolution of the corps législatif, and formally by the government on July 19. Benedetti having accused Bismarck at that period of having originated in 1866 an alleged Franco-Prussian treaty for a mutual cession of territory, the latter had documentary evidence published Aug. 10, 1870, showing that the French ambassador initiated these negotiations on Aug. 5, 1866, by the direction of Napoleon III. Benedetti published in 1871 *Ma mission en Prusse* (3d ed., 1872), disavowing any intentional rudeness toward the king, and maintaining that he acted throughout in simple obedience to his instructions.

BENEDICT, the name of several popes of the Roman Catholic church. **I. Benedict II.,** elected in 684, died in 685. He was a Roman, remarkable for Scriptural science, piety, and kindness to the poor. He caused the decrees of the sixth general council (against the Monothelites) to be accepted by the Spanish bishops, and induced the Greek emperor to give up the usurped right of confirming the election of the pope. **II. Benedict III.,** a Roman, elected in 855, died April 8, 858. He is praised for meekness and benevolence, built and beautified churches in Rome, and in concert with Ethelwolf, king of the Anglo-Saxons, established an English college in Rome. He confirmed the deposition of Gregory, the unworthy bishop of Syracuse, pronounced by Ignatius, patriarch of Constantinople, which was the occasion of the subsequent deposition of Ignatius and intrusion of Photius in his place, and of the Greek schism. **III. Benedict VIII.,** son of the count of Tusculum, and cardinal bishop of Porto, elected June 17, 1012, died in 1024. The German emperor Henry II. and his wife St. Cunegunda were crowned by him. He made two visits to Germany, during the latter of which he received the city of Bamberg as a present, afterward exchanged for Benevento. During his reign the Saracens attacked the pontifical territory, but were defeated and driven away by the troops of Benedict, after a bloody and obstinate battle of three days. The Greeks afterward invaded Apulia, but were driven out by the aid of the emperor Henry. Pope Benedict introduced the custom at Rome of singing the Nicene creed during mass. He renewed the ordinances of the council of Nice relative to sacerdotal celibacy. He was succeeded by his brother, under the name of John XIX. **IV. Benedict XI.** (Nicolò Boccasini), born in Treviso in 1240, died in Perugia, July 6, 1304. He was general of the Dominicans when Boniface VIII. made him cardinal, and afterward bishop of Ostia and Viterbo, and employed him in many important affairs. He was a devoted partisan of Boniface, and remained with him at Anagni after all the other cardinals had fled. Succeeding Boniface in 1303, he composed the difficulties with France and Sicily, both of which kingdoms had been laid under an interdict. He was remarkable for humility. On one occasion, when his mother presented herself at his court splendidly attired, he refused to recognize her until she had resumed the dress suitable to her humble state of life. He died by poison, and was beatified by Benedict XIV. He wrote commentaries on Job, the Psalms, the Apocalypse, and St. Matthew. **V. Benedict XII.** (Jacques de Novellis or Fournier), born at Saverdun, France, died April 25, 1342. He was a Cistercian, and a nephew of John XXII., whom he succeeded in 1334 at Avignon. He was an eminent canonist and theologian, and a severe reformer. He defined the doctrine that the beatitude of the just and the punishment of the wicked commence before the final judgment. **VI. Benedict XIII.,** of the princely house of Orsini, born in the kingdom of Naples in 1649, died Feb. 21, 1730. He became a Dominican at an early age. Having with great reluctance accepted the dignities of bishop and cardinal, he continued to live as a simple monk, and devoted all his leisure hours to study and prayer. As a bishop he was devoted to his pastoral duties, and universally loved; and as cardinal he led what was called the party of the Zelasti, who were pledged to vote at the conclave for the candidate deemed by the college of cardinals the most worthy, without regard to any worldly or political interest. He was chosen to succeed Innocent XIII. in 1724, and accepted the papal dignity under obedience to the command of the general of his order, with many tears. His principal efforts were directed to restore and uphold ecclesiastical discipline. He wrote homilies on the book of Exodus. **VII. Benedict XIII.,** antipope. See Luna, Pedro de. **VIII. Benedict XIV.** (Prospero Lorenzo Lambertini), born of an ancient family at Bologna in 1675, died May 3, 1758. From his youth he devoted himself to study and science, especially to canon law and theology. After a long and laborious career in different offices of the Roman prelature, he was in 1728 made cardinal priest and archbishop of Ancona by Benedict XIII. In 1731 Clement XII. transferred him to Bologna, where he remained until his election to the papacy, which took place, most unexpectedly, Aug. 17, 1740. He was then 65 years of age, and he reigned 18 years. During the intervals of public business he contrived to apply himself to his favorite studies, and maintained a correspondence with all the most eminent writers of the day. He was a great patron of science, learning, the fine arts, and charitable institutions. The complete collection of his works fills 15 folio volumes, and includes treatises on the beatification and canonization of saints, on the mass, on the church festivals, and on canonical and moral questions, besides his *Institutiones Ecclesiasticæ*, and several volumes of *Miscellanea*. Many of these works were originally written in Italian.

BENEDICT, surnamed Biscop, a Roman Catholic saint, born in England in 628, died Jan. 12, 690. At the age of 25 he quitted the court of

King Oswin, at which he held a distinguished position, and devoted himself to the study of theology and monastic discipline. For this purpose he made three journeys to Rome, and then founded the monasteries of Wearmouth and Yarrow, of which he retained the direction. He encouraged the monks in the acquisition of learning, especially with a collection of Greek and Roman authors which he had made upon his travels, and in chanting, introducing the Gregorian chant into England. He also built a stone church at Wearmouth in the Italian style, and furnished its windows with glass brought from France. Among his writings a "Treatise on the Celebration of Feasts" is still extant. His life was written by the Venerable Bede, who was one of his disciples.

BENEDICT, abbot of Peterborough, an English monk and historian, died in 1193. He studied at Oxford, became prior of the monastery of Christ Church in Canterbury, shared the friendship both of Becket and King Henry, assisted at the coronation of Richard I., under whom he was keeper of the great seal, and wrote a history of the two kings and a life of the prelate, which are still extant.

BENEDICT, Sir **Julius,** a German composer, born in Stuttgart, Nov. 27, 1804. Having early developed a talent for music, he was placed by his father, a rich Jewish banker, under the instruction of Louis Abeille, concert master to the king of Würtemberg. At the age of 12 he had made astonishing progress upon the pianoforte, but his father insisted that his musical pursuits should not be allowed to interfere with his literary studies. These latter being concluded in 1819, Benedict was sent to Weimar and placed under the direction of Hummel. In 1820 he went to Dresden to receive lessons from Weber, then engaged in the composition of his *Euryanthe.* With this composer Benedict formed an intimate friendship, accompanying him to Berlin, Vienna, and other cities where Weber's operas were produced. In 1824 Benedict was appointed director of the German opera at Vienna. He went to Naples in 1825, and directed music at one of the theatres in that city for several years, producing his first opera, *Giacinta ed Ernesto,* there in 1827. In 1830 he went to Paris for a short time, and finally in 1835 to London, which city thenceforth became his home. He was soon very popular there as a pianoforte instructor, and held successively and for short periods the position of musical director at the lyceum and at Drury Lane. In 1838 he produced his first English opera, "The Gypsy's Warning," which was succeeded by "The Brides of Venice" and "The Crusaders," all of which were well received and kept the stage for long periods. In 1850 Benedict accompanied Jenny Lind as accompanist and director of the orchestra on her tour in the United States. Returning to Europe in 1851, he had the misfortune to lose both his wife and his eldest child in the same year, while on a trip to Italy. Resuming his musical labors in London in 1852, he devoted himself in great part to composition, producing many works for pianoforte, for stringed instruments, and for orchestra, and acting as conductor at the Italian opera in London and at many of the great English festivals. In 1860 his cantata "Undine" was produced at the Norwich festival. His "Lily of Killarney" was brought out in 1862, his cantata "Richard Cœur de Lion" in 1863, and his operetta "The Bride of Song" in 1864. Among his later works are a concerto for the pianoforte, his "Legend of St. Cecilia," and his oratorio of "St. Peter," which latter was produced at the Birmingham festival of 1870. In 1871 he was knighted.

BENEDICT, Saint, born at Nursia in Umbria in 480, died March 21, 543. His parents sent him to Rome to study, but, disgusted with the vices and temptations he found there, he fled to the desert of Subiaco, between Tivoli and Sora. After a time he could no longer conceal himself, and finally built a monastery on Monte Casino, where he laid the foundation of the Benedictine order, and presided as abbot during 14 years.

BENEDICT OF ANIANE, a Roman Catholic saint, born in Languedoc about 750, died near Aix-la-Chapelle, Feb. 11, 821. Having forsaken the court of Charlemagne, he established himself in a hermitage upon the bank of the Aniane in Languedoc. Such was the austerity of his life that disciples gathered around him, and in 782 he constructed a monastery for their reception. Here he instituted a reform in monastic discipline which was extensively adopted in other convents, and afterward was introduced into all the monasteries of Aquitaine in pursuance of authority received from Louis le Débonnaire. He finally assumed the direction of a monastery which was built expressly for him near Aix-la-Chapelle, and there passed the remainder of his life. He induced the monks who were under his control to copy the works of the best authors, and thus rendered an important service to the cause of civilization. His code of rules was published at Paris in 1663.

BENEDICTINES, an order of monks in the Roman Catholic church. The rules drawn up by St. Benedict gradually superseded those of St. Columban and others which had previously prevailed. His order, founded early in the 6th century, spread rapidly and widely. Its monks planted Christianity in Saxon England, Friesland, and Germany, and Father Boil, a Benedictine, was sent out with Columbus on his second voyage as vicar apostolic of the new world. The order claims 24 popes, 15,000 bishops, and 40,000 beatified or canonized saints. The rules were few and simple. The Benedictines were at first laics, and employed chiefly in manual labor; but gradually the order became a body of learned priests. During the middle ages they were the great preservers of ancient learning and assiduous cultivators of science and art, copying and preserving the

classics, the Scriptures, and writings of the early fathers. For centuries they were the principal teachers of youth in all branches in their colleges and schools. As ascetics the Benedictines were less studied and formal than the later schools. Down to the establishment of the mendicant orders all the monastic bodies in the West based their rules on that of St. Benedict, such as those of Cluny and Cîteaux, with the Bernardines, Feuillants, and Trappists, in France; Carthusians, Camaldolensians, Vallombrosians, &c. Besides these separate orders, reforms were made from time to time in the Benedictine order to revive the ancient discipline. The order of St. Benedict is divided into congregations, and has no general superior. Of these congregations, that of St. Maur, dispersed by the French revolution, is well known for its learned works, including

Benedictine Monk.

the best editions of the fathers. Those in Spain, long reduced to the single monastery at Montserrat, are now suppressed. In Italy, previous to the conquests of Victor Emanuel, the congregation of Monte Casino was very flourishing, embracing the provinces of Rome, Etruria, Lombardy, Naples, Sicily, and Subiaco. The Bavarian congregation comprises five monasteries, the Austrian three, the Brazilian seven, the Mechitarist two provinces with several monasteries at Venice and in the East, the French three monasteries. The English congregation, famous for its ascetical writers, was restored in 1603, and now comprises four monasteries, and the body is well represented in the Roman Catholic hierarchy of England. The Benedictines were introduced into the United States by the Rev. Boniface Wimmer, who established a house at Carrolltown, Penn., in October, 1846, which is now St. Vincent's abbey, he being mitred abbot. The order spread rapidly, and now forms the American Casinensian congregation, comprising two mitred abbots, three monasteries, six priories depending on abbeys, and more than 100 monks. There is also at St. Meinrad's, Indiana, an abbey of the Helveto-American congregation, a filiation of Einsiedeln, founded in 1853, and erected into an abbey and congregation in 1870. The order includes a number of independent houses, some of them very large and flourishing. Of these the most famous are Our Lady of Hermits at Einsiedeln in Switzerland, and St. Peter and Paul near Melk in Austria. The number of Benedictines was estimated in 1869 at 2,089.—**Benedictine Nuns.** St. Scholastica, sister of St. Benedict, is generally regarded as the foundress of the Benedictine nuns. They took part in the conversion of Germany, and St. Walpurga is looked upon as the foundress of all the convents there. Convents of this rule exist in almost all parts where monks are established. There are in the United States 12 convents of Benedictine nuns, devoted to education, in New Jersey, Pennsylvania, Kentucky, Indiana, Illinois, Minnesota, Kansas, and Nebraska. The oldest is that of St. Mary's, Pennsylvania, a filiation of St. Walpurga's at Eichstädt, Germany, established in 1853.

BENEDIX, Julius Roderich, a German dramatist, born in Leipsic, Jan. 21, 1811. He was an actor and singer in early life, and in 1841, while manager of the Wesel theatre, he produced a highly successful comedy, *Das bemooste Haupt* ("The Old Fogy"), which has been followed by about 30 popular plays, several of which have been translated into foreign languages. A complete edition of his dramatic works has been published at Leipsic (22 vols., 1846–'69). He has also edited a literary journal, published popular works on German legends (6 vols., 1839–'40) and the German war of independence (1841); a novel entitled "Pictures from the Life of Actors;" and works on elocution and German rhythm. He has been manager of the theatres of Elberfeld (1844–'5), Cologne (1847–'8), and Frankfort-on-the-Main (1855–'8); and since 1858 he has been devoted to literature at Leipsic.

BENEFIT OF CLERGY, in English criminal law, the *privilegium clericale*, exemption of the clergy from penalties imposed by law for certain crimes. This privilege was for many centuries an important element in the administration of criminal law. It had its origin in the claim made by the ecclesiastics for the entire exemption of their order from the jurisdiction of the common law courts. Before the Norman conquest the greater part of the civil business of the kingdom was transacted in the county courts, and the bishop of the diocese presided in them with the sheriff of the county; and these courts thus possessed both civil and ecclesiastical jurisdiction. But the foreign clergy who came over with the Normans obtained from William the Conqueror a separa-

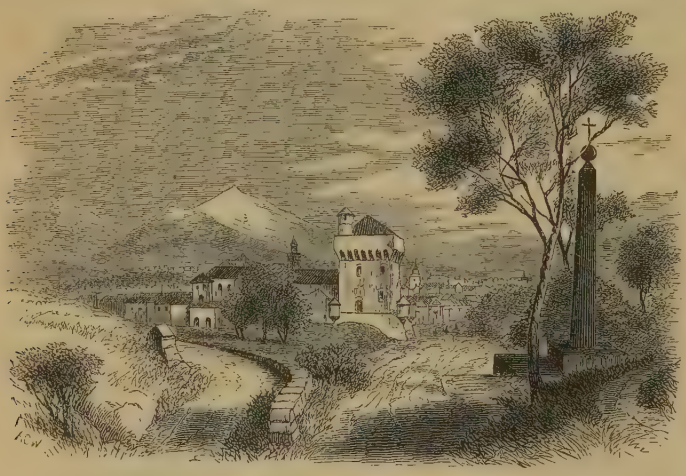
tion of the ecclesiastical from the civil courts. In the reign of Stephen sole jurisdiction was given to the bishop over ecclesiastical persons and causes. This gave rise to a contest between the spiritual and temporal courts. The claim of exclusive jurisdiction was not successfully maintained, except in respect to ecclesiastical causes, but the persons of the clergy were exempted from penalties for certain crimes in cases specifically provided for by common law or statute. The exemption was not allowed in high treason, nor in petit larceny, nor any mere misdemeanor (by which was meant petty crimes less than felony), and was as a general rule allowable only in capital felonies, but not in all even of that class. The exemption was mainly founded on the statute 25 Edward III., by which it was provided that clerks convicted of treason or felonies touching other persons than the king himself should have the privilege of holy church. By the common law, benefit of clergy was denied in three kinds of felony, viz.: lying in wait for one on the highway (*insidiatio viarum*), ravaging a country (*depopulatio agrorum*), and burning of houses (*combustio domorum*); and in all these cases, even after the statute above mentioned, the privilege continued to be denied. It was enacted afterward, in various statutes, that certain crimes should be without benefit of clergy, as murder, rape, burglary, larceny from the person, or from a dwelling house, any one being therein, and many other offences. As to the persons entitled to benefit of clergy, it was originally limited to such as had the *habitus et tonsura clericalis*, that is, the regular clergy; but the claim being made in behalf of the retainers of ecclesiastics, and other laymen, who were not entitled to it, only such as could read were at last allowed the privilege. But in the reign of Henry VII. it was found that there were as many laymen as divines who had an exemption by this test, and a law was then passed making a distinction between lay scholars and such as were in orders. Lay scholars were not allowed to take the benefit of clergy but once, and upon being admitted to the privilege were burned in the hand, probably in order that they might not set up a claim to it again. The distinction was abolished in the reign of Henry VIII., but revived again by the statute 1 Edward VI. It was also enacted by this statute that peers having a place in parliament should have the benefit of peerage, equivalent to that of clergy, for the first offence, although they could not read, and without being burnt in the hand, for all offences then clergyable to commoners, and also for the crimes of house-breaking, highway robbery, horse-stealing, and robbing of churches—a significant indication of the state of morals and education among the highest nobility in that era. In the duchess of Kingston's case, it was held that peeresses were entitled to the benefit of the statute. All these provisions required, as the condition of exemption, that the person claiming exemption should be able to read, so that those who could not read (except peers) were hanged. To remedy this unequal severity, it was enacted by 5 Anne that the benefit of clergy should be granted to all who were entitled to it without requiring them to read. Finally, by statutes 7 and 8 George IV., the benefit of clergy was entirely abolished.—In the United States this privilege has never been recognized as existing. There is, however, a statute (act of congress, April 30, 1790) in which it is provided that benefit of clergy shall not be allowed for any offences punishable by death.

BENEKE, Friedrich Eduard, a German philosopher, born in Berlin, Feb. 17, 1798, disappeared March 1, 1854, his body being found more than two years afterward in a canal at Charlottenburg. After serving as a volunteer in the campaign of 1815, he studied theology and philosophy. In 1820 he lectured in the university of Berlin as a private teacher, but the continuance of his lectures was forbidden in 1822, on account of his departure from the philosophical principles of Hegel. He then taught for a few years in Göttingen, but, upon returning to Berlin in 1827, he received permission to lecture in the university again, and was elected extraordinary professor of philosophy after Hegel's death in 1831. In that capacity he labored with marked success till 1853, when he began to suffer severely from physical disorders. He taught that philosophy must be founded upon a strict and careful examination of the phenomena of consciousness. Among his principal works are: *Erziehungs- und Unterrichtslehre* (2 vols., Berlin, 1835–'6; 3d ed., by Dressler); *Grundlinien des natürlichen Systems der praktischen Philosophie* (3 vols., 1837–'41); *System der Logik als Kunstlehre des Denkens* (2 vols., 1842); *Pragmatische Psychologie, oder Seelenlehre in der Anwendung auf das Leben* (2 vols., 1850).

BENEVENTE, a seaport town of Brazil, in the province of Espiritu Santo, at the mouth of a river of the same name, forming a good harbor, 47 m. S. of Victoria; pop. of the town and its district about 4,000. The port is one of the most frequented in the province, and many ships are built there. Agriculture and the coasting trade are the chief occupations of the district.

BENEVENTO. I. A province of Italy, traversed by the W. ridges of the Neapolitan Apeninnes and the river Calore; area, 675 sq. m.; pop. in 1872, 231,878. The former papal delegation of Benevento contained only an area of barely 100 sq. m. and a population of little over 20,000; but when it became a province of the kingdom of Italy it was considerably enlarged by the addition of territory formerly belonging to the Neapolitan kingdom. Benevento now comprises three districts, one of its own name containing nearly half of the total population of the province, and those of Cerreto Sannita and Bartolommeo in Galdo. Cereals, fruits, wine, oil,

and game abound, and are extensively exported. **II.** A city (anc. *Beneventum*), capital of the province, at the junction of the Calore and Sabbato rivers, and on the railway from Naples to Foggia, 32 m. N. E. of Naples; pop. in 1872, 20,133. The Porta Aurea, one of the gates of the city, which once spanned the Appian Way and now leads to Foggia, is formed by the famous arch of Trajan, with bass reliefs representing his exploits, and one of the finest and best preserved monuments of the kind in Italy. The Corso extends along the ridge on which the city is built, from the cathedral to the castle. In the piazza Orsini is a fountain with a statue of Pope Benedict XIII. Most of the streets, though narrow and steep, contain mansions of old families and other fine residences. There are many convents and churches. The vast and interesting cathedral had its interior completely restored in the 17th century. In the episcopal palace are various antiquities and



Benevento, Italy.

two fragments of Egyptian obelisks in hieroglyphics. The castle is used as the official residence of the local authorities, and Latin inscriptions abound all over the city, as well as bass reliefs and esteemed fragments of ancient statuary. Among other relics are the remains of an amphitheatre, portions of the Roman walls, and an ancient bridge over the Calore. Few Italian cities present greater archæological and historical interest than Benevento. Traditions of a mysterious walnut tree, where the *streghe di Benevento*, as the witches of S. Italy were popularly called, met at night, still linger among the people. Gold and silver ware, leather, and parchment are manufactured, and the corn trade is considerable.—The origin of the city has been variously ascribed to Diomedes and to Auson, a son of Ulysses and Circe. It first appears in history as one of the chief cities of Samnium, and fell into the hands of the Romans in the 3d century B. C., when Pyrrhus was defeated here (275); and about the same period the name of Beneventum was adopted in place of the previous appellation of Maleventum. Under the Romans Beneventum retained great importance till the fall of the empire, on account of its wealth and prosperity and its position on the Appian Way. Under the Lombards it became the capital of a duchy, including many of their conquests in S. Italy, and afterward of a principality with extended dominion, which passed through many vicissitudes, and became extinct in 1077 with the death of Landulph VI. The Normans then seized the territory, while the city came under the sway of the pope. Four councils were held here in the 11th and 12th centuries. On Feb. 26, 1266, Charles of Anjou was defeated here by Manfred of Naples in a celebrated battle, which has been commemorated by Dante. Early in the 15th century the city was for a time under Neapolitan rule, till Ferdinand I. returned it to the pope. In 1688 it was devastated by an earthquake, and its restoration was due to the archbishop of Benevento, afterward Pope Benedict XIII. The papal power was almost uninterruptedly sustained till 1798, when the French took the place and sold it to Naples. Cardinal Ruffo routed here in 1799 a body of French troops. In 1806 Benevento was made a principality by Napoleon I. for the benefit of Talleyrand, but it was restored to the pope in 1815. An insurrection in 1820 was speedly put down; and Benevento had no share in the revolutionary outbreak of 1848–'9. In 1860 it was united to the kingdom of Italy, together with Naples.

BENEVOLENCE, in England, first a voluntary gratuity voted to Edward IV. by his subjects. It was afterward a species of forced loan levied by the kings in violation of Magna Charta. The exaction aroused great indignation, and led to the insertion of an article in the petition of rights, 3 Charles I., by which it was provided that no man should be compelled to yield any gift, loan, benevolence, tax, or such like charge, without common consent by act of parliament. By the statute 1 William and Mary, it is declared that levying money for or to the use of the crown, by pretence of prerogative, without grant of parliament, or for longer time or in other manner than the same is or shall be so granted, is illegal.

BENEZET, Anthony, an American philanthropist, born at St. Quentin, France, Jan. 31, 1713,

died in Philadelphia, May 5, 1784. His father's family, who were Protestants, removed in 1715 to London, where they became Quakers, and in 1731 to Philadelphia. In 1742 Anthony gave up the mercantile business for which he had been educated, and became instructor of the Friends' English school. He published (1762–'7) tracts in opposition to the slave trade, and carried on an extensive correspondence for the purpose of bringing about its abolition. He founded a school for the instruction of persons of African descent, and devised his property for its benefit after the death of his wife. His funeral was attended by a large number of persons of all religious denominations, among whom were several hundred negroes.

BENFEY, Theodor, a German philologist and orientalist, born at Nörten, near Göttingen, Jan. 28, 1809. He studied in Göttingen and Heidelberg, and has been since 1834 professor of Sanskrit and comparative philology in the university of Göttingen. He translated the comedies of Terence into German (1837), and received the Volney prize from the academy of Berlin for his *Griechisches Wurzellexikon* (2 vols., 1839–'42). Among his chief publications are: *Die persischen Keilinschriften* (Leipsic, 1847); *Die Hymnen des Samaveda*, with a translation and notes (1848); *Vollständige Grammatik der Sanskritsprache* (1852); *Chrestomathie* (2 vols., 1853–'4); *Kurze Grammatik der Sanskritsprache* (1855), an English edition of which was published in Berlin in 1863 under the title of "A Practical Grammar of the Sanskrit Language;" a translation of the *Pantchatantra* (2 vols., 1859), upon which he has since published a commentary, as well as upon other Hindoo poetry, in various periodicals, and in his collection entitled *Orient und Occident* (2 vols., Göttingen, 1863–'4); a Sanskrit-English dictionary (London, 1866); and *Geschichte der Sprachwissenschaft und orientalischen Philologie in Deutschland seit dem Anfange des* 19. *Jahrhunderts* (Munich, 1869).

BENGAL, a province of British India, often erroneously termed a presidency. It formerly comprised only the level region watered by the Ganges in the lower part of its course, which is now known as Bengal proper. No such territorial division as the presidency of Bengal has ever in fact existed. The application of that title to the region appears to have originated, by some mistake, from the early acts of the British parliament concerning India, in which "the presidency of Fort William in Bengal" is spoken of. At first this term was evidently intended to describe a district more limited than Bengal itself, and included within it, but it was subsequently applied to a much greater extent of territory. In 1833 the presidency of Fort William, thus enlarged, was divided for administrative purposes into two parts, one of which was placed under the government of the officer known as the lieutenant governor of Bengal, and forms the subject of this article. It constitutes one of the ten great political provinces of India, and lies between lat. 19° and 29° N. and lon. 82° and 97° E., bounded N. by Nepaul and Bootan, E. by Burmah, S. by the bay of Bengal, and W. by the Northwestern and Central Provinces. It is divided into regulation and non-regulation districts. The regulation districts extend over the low, fertile, and densely populated basin of the Ganges, and are subject to a strict and systematic official administration; they include Bengal proper, the native province of Behar, and the maritime districts of Orissa. The wilder outlying countries are comprised in the non-regulation districts, which embrace the hill region of Orissa, the territory S. of Behar called the Southwest Frontier, and the great country of Assam, through which flow the Brahmapootra and its tributaries. Here civilization is far less advanced than in the regulation districts, and the government is comparatively informal. Four native states are under the supervision of the Bengal government: 1, a country on the S. W. frontier, inhabited by aboriginal tribes and little known; 2, the Garrow and Cossyah or Khasia hills, mountainous districts which rise to a height of from 5,000 to 6,000 ft., between Assam and Bengal proper; 3, Tipperah, and 4, Munepoor, two extensive tracts bordering upon Burmah. The area and population of Bengal, according to the official returns for 1871, are as follows:

	Area in Eng. sq. m.	Population.
Province of Bengal	239,591	85,975,274
Native states	79,156	2,139,565
Total	318,747	88,114,839

It is estimated that the population of the non-regulation districts of the province does not exceed 5,000,000.—Bengal is a level plain of vast extent but inconsiderable elevation, forming the N. E. corner of Hindostan. In the south and in the northeast are the mountain tracts of Orissa, and the Garrow and Cossyah hills, respectively. It is intersected by the Ganges, the Brahmapootra, and their tributaries. The two main streams flow across it toward the bay of Bengal and each other, the Ganges from N. W. to S. E., the Brahmapootra from N. E. to S. W. Their waters partially mingle before reaching the coast, as the main trunk of the Brahmapootra unites with an arm of the Ganges at a point about 80 m. inland; but they enter the sea by different mouths, though not more than two miles apart at some points in their course. According to Sir Charles Lyell, the area of the delta of the combined rivers is considerably more than double that of the Nile. The head of the delta, or point where the first arm is given off, is in the case of each river about 200 m. from the sea. Along the coast of the bay of Bengal for a distance of 180 m. is a perfect labyrinth of streams and inlets surrounding the extensive tract of islands denominated the Sunderbunds, a wilderness equal in area to Wales, overspread with jungle and infested by wild beasts. Here the

water is salt, but it is fresh in the Hoogly, the main outlet of the Ganges, on which Calcutta is situated. This channel, the Hauringotta arm, and that which bears the name of the river itself are all navigable. The annual inundations in Bengal cover an immense region, and not unfrequently attain the dimensions of disastrous floods, occasioning great loss of life and destruction of property. Enormous dikes are constructed to restrain the rising waters. It is said that every year, from the 15th of June to the 15th of September, the plains of upper Assam are completely overspread by the floods. Among the most destructive of the inundations are those which sometimes occur when a high spring tide in the bay of Bengal combines with a heavy gale of wind to check the descending outflow of the rivers.—There are but few lakes in Bengal, the most important being the Chilka lake in Orissa, a very curious body of water which forms the southern boundary of that subdivision of the present province, formerly a province itself. It is a shallow inland sea from 3 to 5 ft. in depth, 44 m. long, and varying in width from 5 to 20 m., separated from the ocean only by a narrow strip of sand scarcely exceeding 200 yards in breadth, through which the sea forces its way, at a single point, in a channel a few hundred yards wide. This peculiar lacustrine formation is attributed to the never-ceasing adverse action going on between the rivers and the sea. The water of the lake is salt or brackish except in the rainy season, when it becomes temporarily fresh.—The extreme heat of the climate of Bengal renders it very unhealthy to Europeans. There are three seasons: the cold season, from November to February, with an average temperature of about 68° F., and prevailing northerly winds; the hot season, beginning in March and lasting till the end of May, during which the terrific heat, sometimes 100° and 110° F. in the shade, is occasionally mitigated by tremendous thunder storms of rain and hail; and the rainy season, which sets in with the commencement of the S. W. monsoon, early in June, and lasts till October. The average annual fall of rain at Calcutta is 64 inches, and at Cuttack, on the N. W. coast of the bay of Bengal, only 50 inches; while it rises to 80 inches at Gowahatty in Assam, and 600 inches among the Cossyah hills. During the cold season the climate is comparatively pleasant; but the continual rain and constantly recurring fogs which prevail during the latter half of the wet season make it very disagreeable. The nights are the only comfortable portion of the warmer months. The higher officials, and such other residents of Calcutta as are able to do so, annually resort during this period to the attractive sanatoriums which the government has established among the hill regions of the northern provinces.—The soil of the country is alluvial, and consists of a rich black mould resting upon a sandy clay. There is no substance so coarse as gravel to be found in the great delta, or indeed within 400 m. of the coast. Geological borings at Calcutta have afforded strong evidence that what was once a forest-covered land occupying the present deltaic area has in process of time subsided to a depth of 300 ft.; terrestrial organic remains, animal and vegetable, having been found at even a greater distance below the surface. The valley of the Ganges is famed for its fertility, and the productive power of its lands is renewed without expense to the cultivator by the annual river deposits. Rice is the leading cereal production and an important article of export. Wheat and barley are raised, but only in the higher districts, where millet and maize are also raised for the food of the poorer classes. Peas and beans are extensively cultivated, and much attention is paid to the growth of grains which yield oil, as mustard, sesamum, and linseed. The principal vegetable productions, commercially speaking, in addition to rice, are cotton, indigo, opium, sugar, and tobacco. The civil war in America gave a great impetus to the cultivation of cotton in Bengal, and the quantity exported in 1863–'4 was valued at £3,074,403, against an export value of £76,536 in 1860–'61. The indigo furnished by Bengal alone amounts to five sixths of the entire quantity which the world produces. The best quality is grown between lat. 23° and 27° N. and lon. 84° and 90° E., the crop elsewhere being inferior. About 1,250,000 acres are devoted to indigo cultivation, yielding about 60,000,000 lbs., at a gross profit of 40 per cent. The cultivation of the poppy is carried on principally in Behar, the opium being manufactured at Patna, and known in commerce as Patna opium. No one is permitted to engage in it except on account of the government, which makes advances to the cultivators and purchases the whole crop from them at an established price (in 1869 about 3*s.* 6*d.* per lb.), and sells it, for exportation from Calcutta to China, at an enormous profit. The growth of coffee has been successfully introduced, and large tracts in Assam are devoted to the cultivation of the tea plant. Fruits are numerous, and comprise the orange, pomegranate, pineapple, banana, lime, and cocoanut. The gigantic banian is the most remarkable tree of the dense forests which cover a very considerable proportion of the country. The methods of agriculture are exceedingly primitive, the implements being of the simplest and rudest sort, and the natives knowing almost nothing about economical husbandry. Each ryot, or native cultivator of the soil, usually occupies about 6 acres of land, and seldom more than 24 acres. There are two harvests: one, of rice only, known as the great harvest; and the little harvest, when the less important grains are garnered. Fences are entirely wanting, and the crops are therefore grown without enclosures.—Among the wild animals, the Bengal tiger is the most formidable, and the largest specimens are believed to attain a stature con-

siderably exceeding that of the largest lions. It is much dreaded by the natives, and tiger hunting constitutes a favorite sport among the British army officers and residents. The panther, striped hyæna, jackal, and true civet cats are also found. One species of the rhinoceros (*R. Indicus*) is met with in the valley of the Brahmapootra. The Bengal elephant (*elephas Indicus*), which occurs in great numbers, is extensively domesticated and employed as a beast of burden for military and other purposes. Bears, foxes, antelopes, Indian buffaloes, and monkeys abound. Four species of the crocodile are found in the Ganges and contiguous streams, one of which, the gavial, lives only in fresh water and preys exclusively on fish; the others, however, frequent the Sunderbund region, and attack bathers, and cattle when they come down to drink. The number of venomous snakes is proportionately small as compared with the entire number of serpents; but the terrible cobra de capello is among them. Birds of beautiful plumage are abundant, and crows, storks, the common domestic fowl of Europe, and many varieties of game birds are found everywhere. As a rule, the native horses, cattle, and swine are of inferior breeds and poor; their sheep and goats are rather finer animals.—The administration of the province is intrusted to a lieutenant governor, who is appointed by the governor general of India subject to the approval of the crown. The local divisions, each presided over by a commissioner (hence called commissionerships), with their respective districts, each under an officer denominated magistrate and collector, are as follows: The Presidency—Calcutta, the 24 Pergunnahs, Nuddea, Jessore, the Sunderbunds. Burdwan —Burdwan, Beerbhoom, Bancoorah, Hoogly, Howrah, Midnapore. Rajshahye—Maldah, Dinagepore, Rungpore, Bograh, Rajshahye, Pubna. Moorshedabad—Bhangulpore, Moorshedabad, Monghyr, Purneah, the Sonthal Pergunnahs. Patna—Patna, Shahabad, Behar, Sarun, Chumparum, Tirhoot. Cuttack—Cuttack, Pooree, Balasore, the Tributary Mehals. Dacca—Dacca, Mymensing, Sylhet, Cachar, Furreedpore, Backergunge. Chittagong—Chittagong, Chittagong Hill Tracts, Tipperah, Bulloah. Assam—Kamroop, Durrung, Nowgong, Seebsagur, Luckimpore, Naga Hills, Cossyah and Jynteah Hills. Chota Nagpore—Lohardugga, Hazareebaugh, Singbhoom, Maunbhoom, the Tributary States. Cooch Behar—Gowalpurrah (with the Eastern Dooars), the Western Dooars, the Garrow Hills, Darjeeling, the native state of Cooch Behar. The public revenue is mainly derived from the land tax, which differs in Bengal from that imposed in other parts of India. It was instituted by Lord Cornwallis, then governor general, in 1793, by a permanent settlement with the principal landowners, called zemindars, by which they agreed to pay to the government a sum about equal to one half of that which they receive as rent from their own tenants. Another principal source of revenue is the government monopoly in the growth and manufacture of opium. The amount exported in 1864–'5 was valued at £4,724,300.—The commerce of Bengal is carried on principally with Great Britain. Raw cotton, rice, indigo, saltpetre, and silk are the chief articles of export. The silk product is large, but of inferior quality, the manufactured silk goods of Bengal being surpassed by those of China. Muslins are extensively manufactured in the province. The imports into Bengal for the year ending March 31, 1870, represented a value of £19,496,082, and the exports for the same year a value of £20,-971,121, against £13,656,506 in 1861. Commercial intercourse was formerly carried on almost exclusively by water, the roads being very poor, and the fine causeways constructed by the old native rulers having fallen into ruins. The introduction of railways, however, has somewhat changed the lines of internal trade, as well as given it a vast impetus. In 1859 there were only 142 m. of railway in Bengal; 1,510 m. were open for traffic there in 1870. The East Indian line, which is the grand trunk route to Delhi and the highlands of northern India, traverses the valley of the Ganges from Calcutta upward.—Calcutta, the provincial capital and seat of government of the British East Indian empire, is the most important city in Bengal. According to the last official enumeration, which was made in 1866, the population is 377,924. The cities next in rank are Patna (284,000), Moorshedabad (147,-000), Dacca (67,000), and Burdwan (54,000). These figures, being merely estimates, are only approximations to the true number of inhabitants. The population is made up principally of native Hindoos and the Mohammedan descendants of the ancient Mogul or Mongol invaders, in the proportion of about four of the former to one of the latter. The Mohammedans, who abhor the religious rites and customs of the Hindoos, are most numerous in the eastern districts. On the whole the Bengalese have generally been regarded as a weak, treacherous, and intriguing people.—In the latter part of the 17th century, when the East India company of England established their first trading factories in Bengal, the country was under the sway of a viceroy of the Mogul emperor of Hindostan. Their settlements were small, and they occupied their limited territory as tenants holding under the native rulers. In 1746, however, the war between England and France extended to southern India, and during the succeeding ten years there was a constant increase of British military power in that region; so that when in 1756 news reached Madras that the company's settlers on the Hoogly had been attacked by the nawaub Nazim, the reigning viceroy, and that 146 of them had been thrust into the black hole at Calcutta, where 123 died, Lord Clive was at once despatched with an adequate force to their relief. He landed in Bengal in Febru-

ary of the following year, and on June 23 defeated the nawaub in the famous battle of Plassey, which established English ascendancy in India. The history of Bengal since that date will be found under the title INDIA.

BENGAL, Bay of (Lat. *Gangeticus Sinus*), a gulf of the Indian ocean, embraced between the peninsula of Hindostan on the west and the coast of Lower Siam, Tenasserim, Pegu, and Aracan on the east. With the exception of the Arabian sea, it is the largest indentation on the southern coast of Asia, its width at the broadest part, from Cape Comorin at the southern extremity of Hindostan to the same latitude on the coast of Siam, being 1,400 m. From this point it continues of nearly uniform width to the parallel of Cape Negrais, lat. 16° 1′ N., whence it contracts until the opposite coasts are but 250 m. apart, and terminates in an inlet or indentation of its N. shore, about 50 m. wide, and thickly studded with islands. All that part of the bay lying S. of the parallel of Cape Negrais is distinguished by some hydrographers as the sea of Bengal. The bay (in its wider meaning) receives the waters of many important rivers, among which are the Ganges, Brahmapootra, Hoogly, Irrawaddy, Godavery, and Kistnah. The tide in some places rises at times 70 or 80 feet. On the W. coast there are no good harbors, and no soundings at the distance of 30 m. from land; but on the E. side there are several safe ports, and soundings within 2 m. of the shore. The S. W. monsoon begins to blow on the W. or Coromandel coast about the end of March or early in April. In June it acquires its greatest strength and regularity; in September it subsides; and in October the N. E. monsoon commences, from which time till Dec. 1 navigation in the gulf is fraught with great danger. During the prevalence of both these winds a heavy surf rolls along the entire W. coast, rendering access to the rivers extremely difficult.

BENGEL, Johann Albrecht, a German theologian, born at Winnenden, Würtemberg, June 24, 1687, died December 2, 1752. He distinguished himself at Tübingen as a Greek scholar, early exhibited a predilection for critical study, and was the author of several important works; but that on which his fame as a scholar principally depends is his edition of the Greek Testament, which was published in 1734. It was severely criticised by many eminent scholars, such as Michaelis, Baumgarten, and others; but the acuteness, patience, and judgment with which he compared the ancient copies of the New Testament writings, aided materially in the grouping of the original manuscripts into families which was afterward carried out. His short notes on the New Testament, published in the *Gnomon Novi Testamenti*, have been translated into several languages, and are still held in great esteem. They form the basis of John Wesley's "Notes on the New Testament," which is one of the standard books of Wesleyan Methodism. Bengel also wrote a work on the Apocalypse. He considered the Apocalypse as the key to all prophecy, and believed that any right exposition of it would unseal the entire future history of the world up to the end of time. He thought he discovered in the mystical figures of the seer of Patmos that the world would end in 1836.

BENGER, Elizabeth Ogilvy, an English authoress, born in Wells in 1778, died Jan. 9, 1827. She wrote poetry, dramas, and fiction, but her reputation was due mainly to works of a historical and biographical character. She wrote memoirs of Mrs. E. Hamilton, of John Tobin the dramatist, of Klopstock and his friends, of Anne Boleyn, of Mary, queen of Scots, and of Elizabeth, queen of Bohemia; and when she died she had made some progress in memoirs of Henry IV. of France.

BENGHAZI (anc. *Hesperis*, afterward *Berenice*), a town of Barca, Africa (the Cyrenaica of the Greeks), the seat of a bey, on the E. shore of the Greater Syrtis or gulf of Sidra, in lat. 32° 7′ N., lon. 20° 3′ E.; pop., including neighboring localities, about 7,000, many of whom are Jews and negro slaves. It stands on the verge of a large plain, sandy and barren for nearly half a mile from the shore, but beyond having a fertile but rocky soil to the foot of the Cyrenaic mountains, 14 m. S. E., where cattle abound. The port, formerly capacious, is now accessible only to small craft, being filled up with sand washed into it by the annual rains, from January till March. At the entrance is a large but dilapidated castle. The principal building is the new Franciscan convent with a Roman Catholic church. The miserable houses are built of very small stones cemented with mud, and are generally washed away during the rainy season, when the streets are converted into rivers, and thousands of sheep and goats perish. Drinking water has to be brought from a neighboring village, annoying insects abound, and severe diseases prevail. Ancient reservoirs may be traced, with stone conduits; and besides vestiges of deep quarries, there are remarkable chasms with luxuriant vegetation, so beautifully situated that many of the ancient writers placed here the gardens of the Hesperides. Some of these chasms have become deep lakes, and there are several caves, one of which is said to contain a large body of fresh water at a depth of 80 feet. The latter is identified by some writers with the Lathon river of antiquity, and the large salt-water lake S. of the town with the Tritonis of Strabo. Owing to the condition of the harbor, commerce has declined, and the inhabitants support themselves mainly by agriculture and cattle raising. Large quantities of dates are produced. Nomadic Arab tribes wander over the territories S. and E. of Benghazi. Interesting antiquities are found upon excavation. (See BERENICE.)

BENGUELA. I. A country on the W. coast of Africa, the possession of which is claimed by Portugal. (See ANGOLA.) Its limits are not well defined, but it is commonly described as

lying between lat. 9° and 16° S. and lon. 12° and 17° E., and extending from the river Coanza on the north to near Cape Negro on the south. The land along the coast is low and flat, but it rises in a series of terraces toward the interior, and further back into mountains of considerable height. The low ground near the coast, especially during the rainy season, is extremely unwholesome. On the high ground and among the mountains the air is pure and healthful. Numerous rivers descend from the mountains; of these the Copororo or Rio San Francisco, the Cuvo, and the Longa are the most important. Sulphur, copper, and petroleum are found in the mountains, and also gold and silver in small quantities. Vegetation is luxuriant, and both tropical fruits and European vegetables grow well. Hyænas and lions venture down to the city of Benguela. Elephants, buffaloes, zebras, antelopes, and other animals are found. Cattle are not raised to any great extent. The inhabitants belong to the Congo race, and use the Bunda language. They are naturally harmless, but have become brutalized where they have come in contact with the Portuguese slave traders. Their religion is a form of fetishism. The chief towns are Benguela, Caconda (in the interior), Novo Redondo, and Mossamedes. Mossamedes is the residence of the governor of South Benguela, and was founded in 1840. It is favorably situated and prosperous. **II. São Felipe de Benguela,** the Portuguese capital of the country, is situated on the coast near the mouth of the river Catumbela, in lat. 12° 33′ S., lon. 13° 25′ E.; pop. 3,000. It is so unhealthful that no Europeans can withstand the climate. It is especially fatal to women. The most unwholesome months are March and April, the rainy months, and next to them January and May. The harbor is commodious and safe, but difficult of access. Ivory, panther skins, and the other productions of the country are brought into the city, and it is visited occasionally by Portuguese and Brazilian trading vessels. The city was formerly the principal slave market for the trade with Brazil. It is under the jurisdiction of the governor general of Angola, who resides at St. Paul de Loanda.

BENI, or **Veni,** a department of Bolivia, traversed by the river Beni, and embracing the lofty mountains and immense wooded plains which cover the northern portion of the republic. These plains are watered by large rivers, which during the floods overflow their banks, inundating and fertilizing the surrounding regions. Its capital is Trinidad, and it is divided into the three provinces of Mojos, Yuracares, and Caupolican. The probable area is 150,000 sq. m., with perhaps 54,000 inhabitants of European origin, besides some 10,000 Indians, but few of whom are civilized. Gold is found in some parts along the banks of the Beni. Large quantities of coca are produced, and some of the European grains and fruits. The climate is temperate and in winter even cold.

BENI, Veni, or **Paro,** a river of Bolivia, formed by a number of head streams rising in the Andes, N. W. of Cochabamba. After flowing N. W. 300 m., and receiving the waters of the Queloto, Tipuani, Mapuri, and other large rivers, it bends, and holds a N. E. course to the frontier of Brazil, where it swells the united streams of the Mamoré and Iténez to form the Madeira, the principal tributary of the Amazon. The whole valley of the Beni not having been yet explored, little else is known than that the river waters extensive plains of great fertility in the departments of La Paz and Beni.

BENICARLO, a town of Spain, in the province of Castellon, on the Mediterranean, 80 m. N. E. of Valencia, on the railroad to Barcelona; pop. about 7,000. It is surrounded by walls, and has a ruined castle, a fishing port, and a church with an octangular tower. It is an ill-built and dirty town, chiefly noted for the red and full-flavored wine produced in the neighborhood, which is largely exported to Bordeaux, to enrich poor clarets for the English and American market.

BENICIA, a town, capital of Solano co., California, and formerly of the state, on the strait of Carquinez, which connects San Pablo and Suisun bays, 30 m. E. N. E. of San Francisco; pop. in 1870, 1,656. The land for about a mile from the town is level or gently undulating. The valleys are capable of cultivation, but in and around the town there is not a tree to be seen. The houses are of wood, and present a neat and respectable appearance. The harbor is capable of accommodating the largest ships. It is connected with San Francisco by regular lines of steamers. Arrangements have been made (1872) for the construction of a railroad from Benicia up the Sacramento river to Red Bluff, with a branch to Sacramento. It has extensive cement works, tanneries, and a large flouring mill. The place contains the government depot of arms and supplies for the military stations on the Pacific coast, and has extensive barracks, storehouses, magazines, and shops for the manufacture and repair of army material. It has also a law school, a collegiate institute, St. Augustine's theological school (Episcopal), with 6 professors and 7 students, a convent, a female seminary with 8 instructors and 45 students, and a Catholic and an Episcopal church.

BENIN. I. A kingdom of Africa, on the Guinea coast, bounded N. W. by Yoruba, W. by Egba, E. and S. E. by the Niger and its E. branch, the Bonny. The name was formerly applied to the whole of the coast of the gulf of Guinea, and the kingdom was supposed to be very large and powerful. The coast is low, swampy, and cut up by numerous arms of the Niger. The soil is fruitful, yielding rice, yams, sugar, and in general all the products of Guinea. Palm trees grow luxuriantly. The population is dense. The king is worshipped as fetish. The chief towns are Benin and Wari

or Warrah, situated 115 m. further S. upon an arm of the Niger. Wari seems to be the chief city of a negro kingdom which is subject to the king of Benin. No European settlements are now found upon the coast of Benin. Even the port of Gato (Agathon), which was situated 46 m. below Benin on the Formosa, and once had a number of European factories, has disappeared from the map. Benin was discovered by the Portuguese Diogo Cam in 1484, and was visited in 1486 by Alfonso Aveiro. In 1786 the French made settlements at the mouth of the river, which were destroyed by the English in 1792. **II.** A town, the capital of the kingdom, situated on the right bank of the westernmost arm of the Niger, formerly supposed to be an independent stream and called the Benin or Formosa river; pop. 15,000. The town occupies a large surface, and has an active trade, though since the breaking up of the Guinea slave trade it has been surpassed in commercial prosperity by Bonny, at the E. mouth of the delta. **III. Bight of,** the N. part of the gulf of Guinea, W. of the delta of the Niger, on the Slave Coast.

BENIOWSKY, Moritz August, count, a Hungarian soldier and adventurer, born at Verbó in the county of Neutra, in 1741, died May 23, 1786. He was the son of an Austrian general, served as lieutenant in the seven years' war, and afterward studied navigation at Hamburg, Amsterdam, and Plymouth. Having joined the Poles in the war against Russia, he was taken prisoner and exiled to Kamtchatka in 1770. On his voyage thither he saved the vessel from destruction by storm, and this service, with his skill in chess, procured for him a kind reception from the governor of Kamtchatka, who appointed him instructor of his children in French and German. Having promised to colonize the southern extremity of Kamtchatka with his countrymen, he received in marriage the hand of Aphanasia, the governor's daughter, though he had another wife in Europe. With her assistance he made his escape in 1771, with a number of companions, first defeating a detachment of Russians and capturing a fortress with a large treasure. He first went to Formosa and then to Macao, where many of his company died, and among them Aphanasia. He then took passage for France, entered the army, obtained the command of a regiment of infantry, and afterward received a commission to plant a colony in Madagascar, where, having ingratiated himself with the natives, he was made king of one of the tribes in 1776. In order to obtain assistance for his colony he returned to France, but was treated with so much severity by the French ministry that he went into the service of Austria, and was in the engagement between the Austrians and Prussians at Habelschwerdt in 1778. In 1783 he organized an expedition for Madagascar, obtaining some of the funds which he needed from private individuals in London, but the larger part from a mercantile house of Baltimore. He set sail with his expedition in October, 1784. In Madagascar he provoked hostilities with the French, and finally lost his life in a fight with French troops, which were sent against him from the Isle of France. Translations of his autobiography, which was written in French, were published by Nicholson in England (2 vols., 1790), and by Forster and Ebeling in Germany. Kotzebue's play, "The Conspiracy of Kamtchatka," and an opera of Boïeldieu, were founded upon the events of his life.

BENJAMIN, a Hebrew patriarch, the youngest son of Jacob, full brother of Joseph, these being the only children by Rachel. His mother, dying in childbed, called him *Ben-oni*, meaning "son of my torment" (cause of my misfortune), or "son of my wealth" (my treasure); but his father changed the name to *Ben-yamin*, "son of the right hand" (my support, or perhaps in reference to Rachel). The Samaritan code has *Ben-yamim*, "son of days," that is, "son of old age." Benjamin was an infant at the time of the abduction of his brother Joseph, and as he grew up became the favorite son of his aged father. Jacob, in his dying address to his children, says that "Benjamin will ravin as a wolf, devouring prey in the morning, and dividing spoil at night;" allusions to a fierce and ungovernable disposition, a characteristic which his tribe seems to have manifested during its whole existence. The sons of Benjamin outnumbered those of any of his brothers; but at the exodus the tribe was the smallest of all except that of Levi. The territory in Canaan assigned to the tribe of Benjamin, between Judah and Ephraim, and Dan and the Jordan, was comparatively small, but in ancient times noted for fertility. It included the stronghold of Jebus, afterward Jerusalem, Jericho, Bethel, Gibeah, Ramah, and Mizpeh. The Benjamites became noted for their expertness in the use of arms, especially of the sling. During the period of the judges the tribe was almost exterminated in a reckless struggle with the others; but in time it recovered from the blow. Saul, the first king of Israel, was a Benjamite; and after his death the tribe adhered to his son Ishbosheth in opposition to David, who had become king of Judah. The assassination of Abner by Joab, and David's public disclaimer of all part in it, decided the Benjamites in his favor, and they thenceforward entered into the closest relations with Judah; and when the disruption of the kingdom took place, Benjamin and Judah alone adhered to the house of David, the other ten tribes going off with Jeroboam. From this time the general history of the tribe becomes merged in that of the kingdom of Judah, although it appears that some sort of tribal organization was ever maintained, for the tribe is separately mentioned wherever the statistics of the kingdom are given, down to the time of the return from the Babylonish captivity.

BENJAMIN, Judah Peter, an American lawyer and senator, born in Santo Domingo in 1812, of Jewish parents, who emigrated to Savannah

in 1816. He entered Yale college in 1825, but left without graduating. In 1831 he went to New Orleans, studied law, supporting himself by teaching, was admitted to the bar in 1834, and rose rapidly to a high position in the profession. He also became prominent as a politician, attaching himself to the whig party. In 1852 he was chosen to the senate of the United States, where he soon allied himself with the democratic party, in consequence of the action of the two parties on the slavery question. In 1859 he was reëlected to the senate, his colleague being John Slidell. On Dec. 31, 1860, in a speech in the senate, he avowed his adhesion to the southern cause; and on Feb. 4 he withdrew from the senate, and was at once appointed attorney general in the provisional government of the southern confederacy. In August he was appointed acting secretary of war, but resigned in February, 1862, on account of having been censured by a congressional committee. He however stood high in the confidence of Jefferson Davis, and was appointed secretary of state, which position he held until the downfall of the confederacy. He then took up his residence in London, where he entered successfully into the practice of the legal profession, and in 1866 published "A Treatise on the Law of Sale of Personal Property."

BENJAMIN, Park, an American poet and journalist, born in Demerara, British Guiana, Aug. 14, 1809, died in New York, Sept. 12, 1864. His father was of Welsh descent, but was born in Connecticut, whence he removed to Demerara and carried on business there. Park was sent at an early age to his father's home in New England for medical advice and to be educated. He studied two years at Harvard college, graduated at Trinity college, Hartford, in 1829, began to practise law in Boston in 1832, and was one of the original editors of the "New England Magazine." In 1837 he removed to New York, edited in connection with C. F. Hoffman the "American Monthly Magazine," and subsequently was associated with Horace Greeley in editing the "New Yorker." He was soon after employed in connection with Epes Sargent and Rufus W. Griswold as editor of the "New World," a weekly literary journal. In 1844 he withdrew from this publication, and during the rest of his life resided in New York, devoted to literary pursuits. He contributed both in prose and verse to various periodicals, and delivered lectures and read poems in public. Mr. Benjamin was in person a man of full chest and powerful arms, but, either in consequence of an illness in childhood or from birth, was completely lame below the hips. No collected edition of his writings has been published.

BENJAMIN OF TUDELA, a Jewish rabbi, noted in history as the first western traveller who penetrated into the remoter regions of the East, born at Tudela in Navarre, died about 1173. He made a journey from Saragossa by way of Italy, Greece, Palestine, and Persia, to the confines of China, and returned home by way of Egypt and Sicily. Many of his descriptions of places seem however to have been derived from other sources than personal travel and observation. The specific object of his journey was to acquaint himself with the state of his brethren in the East. His "Itinerary," though marred by many errors of fact, and betraying in general a lack of critical inquiry, contains a great deal of valuable information. It was first written in Hebrew, but has been published also in Latin, French, Dutch, German, and English. The first Hebrew edition was published in 1543, at Constantinople; the best is that of Asher (2 vols., London, 1841), embracing an English translation and extensive critical notes.

BEN LOMOND, a mountain of Scotland, in the N. W. of Stirlingshire, on the E. side of Loch Lomond. It forms the S. extremity of the Grampians or central Scottish highlands, rises to a height of 3,192 ft., and is covered with vegetation to the summit. On the N. side it terminates by an abrupt precipice 2,000 ft. high, while the S. E. side is a gentle declivity. The view from the summit is unsurpassed.

BENNET, Henry, earl of Arlington, an English statesman, born at Arlington, in Middlesex, in 1618, died July 28, 1685. Devoting himself to the cause of Charles I., he was appointed under-secretary of state, fought in several battles, and was wounded at Andover. After the battle of Worcester he retired to Spain. Upon the restoration he returned to England, and was rewarded for his services by being appointed keeper of the privy seal, and shortly afterward secretary of state. In 1664 he was created Baron Arlington, and in 1672 earl of Arlington. He was one of the plenipotentiaries sent to Utrecht to negotiate a peace between Austria and France. This mission not being successful, an endeavor was made by his colleagues to cast the odium of the failure upon Arlington; he, however, defended himself before the house of commons, and was acquitted. The war with Holland, which is said to have been caused by the machinations of the "cabal" of which he was a member, lost to Arlington the favor of the king and people; but he received the office of chamberlain. In 1679 he became a member of the council, and retained his office of chamberlain on the accession of James II.

BENNET, Thomas, an Anglican theologian and controversialist, born in Salisbury, May 7, 1673, died Oct. 9, 1728. He was extensively acquainted with the Greek, Latin, and oriental literatures, and composed verses in Hebrew. In 1700 he became rector of St. James's, Colchester, which position he held till 1714, when he received the degree of D. D., and removed to London, where he was presented to the vicarage of St. Giles's, Cripplegate. Besides his works in confutation of popery, schism, Quakerism, and the principles of the nonjurors, he wrote tracts on baptism, litur-

gies, and clerical rights, and an examination of Clark's "Scripture Doctrine of the Trinity."

BENNETT, James Gordon, an American journalist, founder and proprietor of the "New York Herald," born at New Mill, Keith, in Banffshire, Scotland, Sept. 1, 1795, died in New York, June 1, 1872. He remained at school in his native place till he was 14 or 15 years of age, when he went to a Roman Catholic seminary in Aberdeen, with a view to preparing for holy orders in that church, of which his parents were members. At this institution he pursued the usual routine of academic life for two or three years, when he abandoned the intention of entering upon an ecclesiastical career, and soon after determined to emigrate to America. He embarked with a youthful companion in April, 1819, and arriving in Halifax with but scanty pecuniary resources, took up the occupation of teaching. He was led to this employment by necessity rather than inclination, and after a brief experience of its annoyances left Halifax for Portland, and thence made his way to Boston in the autumn of 1819, and obtained the situation of a proof-reader in the publishing house of Wells and Lilly. During his residence in Boston he published several poetical compositions. In 1822 he went to New York, and soon accepted the offer of Mr. Willington, the proprietor of the "Charleston Courier," to employ him as a translator from the Spanish-American papers. He also prepared original articles for the "Courier." After a few months he returned to New York, and issued proposals for the establishment of a commercial school. This plan was not carried into effect, and his next step was the delivery of a course of lectures on political economy, in the vestry of the old Dutch church in Ann street. In 1825 Mr. Bennett first became the proprietor of a public journal, having purchased a Sunday newspaper called the "New York Courier." The enterprise was not successful, and he obtained employment as a writer and reporter for several journals of the city. In 1826 he became connected with the "National Advocate," a democratic newspaper published by Mr. Snowden. After the state election of that year he began to take an active part in politics, vehemently opposing the tariff, and discussing banks and banking. In the spring of 1827 he discontinued his connection with the "National Advocate," which, after having changed proprietors, espoused the cause of John Quincy Adams, while Mr. Bennett was a warm partisan of Martin Van Buren, then in the senate of the United States. He was next engaged with Mordecai M. Noah as associate editor of the "Enquirer," and became a member of the Tammany society. During the presidential canvass of 1828 he was devoted to the interests of Gen. Jackson, residing at Washington as correspondent of the "Enquirer." After the fusion of that journal with the "Courier," in 1829, he continued to write in the editorial department of the "Courier and Enquirer," and in the autumn of the same year became an associate editor. In 1831 he wrote a series of articles on the banking system of the United States, and coöperated with Gen. Jackson and the democratic party in their opposition to the recharter of the United States bank. In 1832, the senior editor, J. W. Webb, having determined to support the United States bank, Mr. Bennett withdrew from the paper, and in October of the same year issued the first number of a new journal called the "New York Globe." This was published precisely one month, during which time it was strenuously devoted to the cause of Jackson and Van Buren. Mr. Bennett then purchased a share in the "Pennsylvanian," a daily journal of Philadelphia, and became its principal editor. In 1834 he returned to New York, and in May, 1835, issued the first number of the "New York Herald." Mr. Bennett began the enterprise with a capital of $500, and was once robbed and twice burned out within the first 15 months, but at the end of that time found himself worth nearly $5,000. As his capital increased he spent money freely in promoting the interests of his paper, which by this means and through Mr. Bennett's wit, originality, and industry speedily became celebrated and achieved great success. Four months after the fire which destroyed his office there was a great fire in Wall street and its neighborhood. The "Herald" largely increased its prosperity by publishing full accounts of it, illustrated with a map of the burnt district and a woodcut of the exchange on fire. It was the first newspaper that published a daily money article and the stock lists. In 1837 it set up a ship news establishment, consisting of a row boat, manned by a captain and two men, which intercepted ships as they arrived and got from them their news and the passenger lists. In 1838 steam communication with Europe was opened by the arrival of the Sirius and Great Western. Mr. Bennett sailed in the Sirius on its return trip, and made arrangements for correspondence from all parts of Europe. The first speech ever reported in full by telegraph, that of Mr. Calhoun on the Mexican war, was transmitted to the "Herald." That journal was independent in politics, but generally supported the democratic party, and advocated the compromise of 1850 and the fugitive slave law. But it adhered to Fremont and the republican party in 1856, publishing articles against the extension of slavery, and supported the government during the civil war. In 1871 an expedition to search for Dr. Livingstone in Africa was sent out by the "Herald;" and Mr. Stanley, its head, arrived in England the following year, reporting that he had succeeded. (See Livingstone.) The profits of the "Herald" at the time of Mr. Bennett's death were estimated as being from one half to three quarters of a million dollars per annum. Mr. Bennett was married in 1840. He died in the Roman Cath-

olic faith, receiving the last sacrament from Archbishop McCloskey. He bequeathed the "Herald" to his only son, JAMES GORDON BENNETT, jr., who is now its editor and proprietor.

BENNETT, John Hughes, an English physician, born in London, Aug. 31, 1812. He studied surgery under William Sedgwick and medicine in the university of Edinburgh, where he took his degree in 1837, receiving a medal for the best surgical report, while Sir Charles Bell highly commended his thesis on the "Physiology and Pathology of the Brain." He afterward studied two years at Paris and two years in Germany. In 1843 he was appointed pathologist to the royal infirmary, Edinburgh; and in 1848 he succeeded Dr. Allen Thomson as professor of the institutes of medicine in Edinburgh university. He was (1841) the first in Great Britain to advocate the use of cod-liver oil for the cure of consumption, scrofula, and kindred diseases, and to deliver lectures on histology. He discovered a disease of the blood which he called leucocythæmia or white-cell blood. He also proved that the hemlock of the present day is the same drug by which Socrates was poisoned. His publications include "Inflammation of the Nervous Centres," "Treatise on Inflammation," "Cancerous and Cancroid Growths," "Pathology and Treatment of Molecular Consumption," "Treatment of Pulmonary Consumption," "Lectures on Molecular Physiology, Pathology, and Therapeutics," "Principles and Practice of Medicine," and "Pneumonia." His most important work, "On Clinical Medicine" (1856), has passed through many editions in both hemispheres, and has been translated into many languages.

BENNETT, Sir **William Sterndale,** an English composer, born in Sheffield, April 13, 1816. He is the son of Mr. Robert Bennett, for many years organist of the parish church at Sheffield. At the age of eight he was entered as chorister at King's college, Cambridge, where his maternal grandfather, James Donn, was curator of the royal botanical garden, and two years later commenced his musical studies at the royal academy of music. He at first chose the violin as his instrument, but soon abandoned it for the piano. His studies in composition were begun early under the direction of Dr. Crotch; and while still at the academy his first symphony, in E flat, was produced, and this was speedily followed by his pianoforte concertos. At the academy his master in pianoforte instruction was Cipriani Potter, but after leaving it he became the pupil of Moscheles. In London he met Mendelssohn, to whom he became ardently attached, and whose influence upon his method of composition is very marked. Under Mendelssohn's advice he determined to continue his musical studies in Germany, where he could have the benefit of the counsel and instruction of that celebrated composer; and the years 1836–'8 were passed at Leipsic. At the Gewandhaus concerts in that city his overture to the *Naïades*, his concerto in C minor, and other works were performed under the personal direction of Mendelssohn. Returning to London, Bennett commenced his career as musical instructor, director of concerts, and composer. In 1856 he was appointed professor of music at the university of Cambridge, and received the degree of Mus. Doc. the same year. In 1869 he received the degree of M. A., and in 1870 he was created D. C. L. of the university of Oxford. From 1856 to 1868 he conducted the philharmonic concerts, and in the latter year was made principal of the royal academy of music. In 1871 the honor of knighthood was conferred upon him. The principal works of this composer are his operas, "The Wood Nymphs" and "Parisina;" his cantatas, "The May Queen" and "The Woman of Samaria;" and several concertos for piano and orchestra. He has composed many minor works for the pianoforte in connection with stringed instruments, and for that instrument alone; also a number of songs; and he has written a treatise on harmony, and one entitled "Classical Practice for Pianoforte Students."

BEN NEVIS, a mountain of Inverness-shire, Scotland, the second highest in Great Britain. It rises abruptly from the narrow plain which separates it from Loch Eil to a height of 4,370 ft. Its outline is well defined; its circumference at the base exceeds 24 m. The lower portion consists of granite, and is usually covered with rich grass; while the upper part is a mass of porphyry. In places near the summit snow lies the year round. When the atmosphere is clear the summit commands a view of 25 m. in every direction, extending from sea to sea.

BENNINGSEN. I. Levin August Theophil, count, a Russian general, born in Brunswick, Feb. 10, 1745, where his father served as colonel in the guards, died Oct. 3, 1826. He was a page at the Hanoverian court of George II., and afterward a captain in the Hanoverian army, resigning his commission to marry the daughter of the Austrian ambassador at Hanover. Having squandered his fortune and lost his wife, he entered the Russian service, and under Catharine II. distinguished himself as a cavalry officer, and was richly rewarded. Disgraced by Paul I., he entered into Count Pahlen's conspiracy, and led the way when the assassins broke into the czar's bedchamber. Paul hid himself in the chimney. Benningsen dragged him down, and when the conspirators hesitated untied his own sash, rushed upon the czar, and with the help of the others succeeded in strangling him. Benningsen expedited the murder by striking Paul on the head with a heavy silver snuff box. From Alexander I. Benningsen received an important military command. In the war of Russia, Austria, and England against France in 1806, he repulsed Lannes and Bernadotte at Pultusk, and extricated the Russians from a critical position into which they had been brought by Marshal Kamensky. Soon after he was made commander-in-chief of the

army then in the field against Napoleon, and fought the French at Eylau, Feb. 7–8, 1807, but on June 14 he was beaten at Friedland. He was present at the battle of Borodino (1812) as aid to Gen. Kutuzoff. On Oct. 18 of the same year he gained a brilliant advantage by surprise over Murat at Tarutino. He left the service on account of difficulties with Kutuzoff, but reëntered it on Kutuzoff's death. He had an important part at the taking of Leipsic, and was in command of the army which was besieging Hamburg when Napoleon was overthrown in 1814. After the peace of 1815 the command of the second army, which was stationed in the south of Russia, was given to him. He resigned in 1818, and died poor and blind. **II. Alexander Levin,** count, a Hanoverian statesman, son of the preceding, born at Zakret, near Wilna, July 21, 1809. He occupied the highest positions in the cabinet and the chambers from 1841 to 1866, when Hanover was annexed to Prussia. **III. Rudolf von,** a Hanoverian statesman, belonging to a junior branch of the same family, born in Lüneburg, July 20, 1824. After many able but ineffectual attempts, as a member of the chambers and in other capacities, to protect Hanover against the fatal course of George V., he was elected in 1866, after the annexation of his country to Prussia, to the North German diet and the Prussian assembly of delegates, and became vice president of these bodies and a statesmanlike leader of the liberal national party. He has presided since the close of 1868 over the local administration of the province of Hanover, and attended the conferences at Versailles in December, 1870, in respect to the formation of the new German empire.

BENNINGTON, a S. W. county of Vermont, bordering on New York and Massachusetts; area, about 700 sq. m.; pop. in 1870, 21,325. It is skirted by the Green mountains on the east, and watered by the Battenkill, Hoosick, and smaller streams. In the N. part of the county, especially in Dorset township, large quantities of marble are quarried, some varieties of which are very white and fine, and take a high polish. The county is crossed by the Harlem Extension, Troy and Boston, and Rensselaer and Saratoga railroads. The chief productions in 1870 were 108,537 bushels of Indian corn, 161,876 of oats, 196,791 of potatoes, 35,542 tons of hay, 416,655 lbs. of cheese, 412,092 of butter, 146,419 of wool, and 170,268 of maple sugar. There were 2,529 horses, 5,659 milch cows, 4,543 other cattle, 32,068 sheep, and 2,592 swine. Capitals, Bennington and Manchester.

BENNINGTON, a township in the S. W. part of Bennington co., Vt., 102 m. S. by W. of Montpelier; pop. in 1870, 5,760. It is on the Harlem Extension and Troy and Boston railroads, and includes the villages of Bennington, one of the capitals of the county, Bennington Centre or Old Bennington, North Bennington, and Bennington Iron Works. It has important manufactories of fine porcelain and Parian ware, material in abundance and of excellent quality being found in the vicinity of the town. —On Aug. 16, 1777, Gen. Stark, at the head of a body of New Hampshire militia, defeated in Bennington a detachment of Burgoyne's army under Col. Baum. Shortly after the retreat of the latter the battle was renewed by a British reënforcement, which in turn retreated on the approach of darkness. The British lost 200 killed, 600 prisoners, and 1,000 stand of arms; the Americans, 14 killed and 42 wounded. No trace now remains to indicate the precise locality of the engagement.

BENNO, Saint; bishop of Meissen, born at Hildesheim about 1010, died June 16, 1107. He was a Benedictine of Hildesheim when in 1051 he was appointed canon of the church in Goslar, whence he was promoted by Henry IV. to the bishopric of Meissen. In the war between that emperor and Pope Gregory VII., he ultimately declared for the pope, and was several times made a prisoner. When in 1085 he supported in a council the excommunication pronounced against the emperor, the latter took from him his bishopric, which was afterward restored by the antipope Clement III. In the 15th century pilgrimages were made to his tomb, and in 1523 he was canonized.

BENOOWE, Benue, or **Binue** (the mother of waters), a river of central Africa, the main tributary of the Quorra or Niger, formerly known as the Chadda, Tchadda, or Tsadda, because it was supposed to be an outlet of Lake Tchad; but there is probably no connection between it and that lake. It rises in an unexplored region in the interior of Soodan, flows W. through Adamawa or Fumbina, receiving its three principal branches, the Kebbi and the Gongola from the north and the Faro from the south, turns S. W. and joins the Niger just above the town of Igbebe, 250 m. from the sea. The Benoowe is more than 700 m. long. It was seen by the Lander brothers in 1830, and explored for 104 m. by Richard Lander, Allen, and Oldfield in 1833. Dr. Barth, while travelling in Adamawa in 1851, came upon the river at the mouth of the Faro, ascertained its true name, and says it was 800 feet wide at that point. In consequence of his reports, an expedition under Dr. Baikie, fitted out at the joint expense of Mr. Macgregor Laird and the English government, sailed up the Benoowe in a steamer in 1854, to a point about 400 m. from the Niger and below the mouth of the Faro. Dr. Baikie made a second expedition in 1857, but added little to the stock of knowledge already possessed. During the rainy season, in August and September, the volume of water poured by the Benoowe into the Niger is enormous. The right bank of the river and part of the left is in the power of the Fellatahs.

BENSON, George, an English dissenting clergyman and author, born in Great Salkeld in 1699, died in 1763. From 1721 to 1763 he

held pastoral charges first at Abingdon, Berkshire, next at Southwark, and finally as colleague of Dr. Lardner in the congregation of Crutched Friars. Among his works are: "A Treatise on Prayer" (1731), "Comments on some of the Epistles," "History of the first Planting of Christianity" (1735), "Reasonableness of the Christian Religion," "History of the Life of Christ," and "An Account of the Burning of Servetus, and of the concern of Calvin in it." In his early ministerial career he was Calvinistic in theology; later he became an Arian, and endeavored to suppress some of his former publications.

BENSON, Joseph, an English clergyman, born at Melmerby, Cumberland, Jan. 25, 1748, died Feb. 16, 1821. He was educated for the established church, but at the age of 16 was converted under the influence of the Methodists, and soon after joined their denomination. Such was his proficiency in the ancient languages that at the age of 18 Wesley appointed him classical master at Kingswood school. At the same time he was a student at St. Edmund's Hall, Oxford. In 1769 he was called to the head mastership of Lady Huntingdon's theological school at Trevecca, but was soon dismissed because he could not agree with the Calvinistic views of the founder. His application to enter orders in the established church having been rejected, he was admitted in 1771 into the Methodist conference, and for many years occupied the most important stations of the church. After the death of Wesley he was chosen president of the conference. While in this office his congregations sometimes numbered 20,000. For many years he was editor of the "Weslyan Magazine," the chief organ of the Methodist church in England, conducting it to the time of his death. His chief writings are: "A Defence of the Methodists" (1793), "A Further Defence of the Methodists" (1794), "Vindication of the Methodists" (1800), "Apology for the Methodists" (1801), "Sermons on Various Occasions" (2 vols.), "Life of John Fletcher," and "A Commentary on the Holy Scriptures" (5 vols. 4to.). See Macdonald's "Life of Benson," and Trefry's "Memoirs of Rev. Joseph Benson."

BENT, a S. E. county of Colorado, bordering on Kansas; area, about 2,000 sq. m.; pop. in 1870, 592. The Arkansas river forms the greater part of its S. boundary, and one of its branches, the Big Sandy, crosses the E. end.

BENTHAM, Jeremy, an English juridical philosopher, born in London, Feb. 15, 1748, died in Queen-square place, Westminster, his residence for 40 years previously, June 6, 1832. His great-grandfather, a prosperous London pawnbroker of the time of Charles II., had acquired some landed property, which remained in the family. His grandfather was a London attorney; his father, who followed the same profession, was a shrewd man of business, and added considerably to his patrimony, principally by fortunate purchases of land and leases. These London Benthams were probably an offshoot from an ancient Yorkshire family of the same name, which boasted a bishop among its members; but Jeremy did not trouble himself much to trace his genealogy beyond the pawnbroker. His mother, Alicia Grove, was the daughter of a retired Andover shopkeeper. Jeremy Bentham, the eldest and for nine years the only child of this marriage, was for the first 16 years of his life exceedingly puny, small, and feeble. At the same time he exhibited a remarkable precocity, which greatly stimulated the pride as well as affection of his father. He had a decided taste for music, and at five years of age acquired a knowledge of musical notes and learned to play the violin. At four or earlier, having previously learned to write, he was initiated into Latin grammar, and in his seventh year entered Westminster school. Meanwhile he was taught French by a private master at home, and at seven read *Télémaque*, a book which strongly impressed him. Learning to dance was a much more serious undertaking; he was so weak in the legs as to make it laborious and painful. Young as he was, he acquired distinction at Westminster as a fabricator of Latin and Greek verses, the great end and aim of the instruction given there. When 12 years old he was entered as a commoner at Queen's college, Oxford, where he spent the next three years. The young Bentham had not been happy at school. He had suffered from the tyranny of the elder boys, though he escaped the discipline of corporal punishment, and was but once forced into a boxing match. Neither was he happy at Oxford. Though regarded by others and taught from infancy to regard himself as a prodigy, he was yet exceedingly diffident, and to the highest degree sensitive of any slight or neglect—peculiarities which, as well as his high estimate of himself, clung to him through life. His tutor was morose, the college dull, while his sensitive pride suffered much from the mingled penuriousness and meddlesomeness of his father, who kept him on very short allowance, and who, in spite of all his affection for his son, of whose ultimate distinction he had formed the highest hopes, failed entirely to comprehend the boy's delicacy and diffidence, and never gained either his confidence or his love. His mother had died two years before he entered the university, leaving him an only brother, afterward Sir Samuel Bentham. Several years after his father married for a second wife the widow of a clergyman, already the mother of two boys, of whom the eldest, Charles Abbott, was afterward speaker of the house of commons, and finally raised to the peerage as Lord Colchester. There were no children by this second marriage, yet it was a source of great vexation to Bentham, to whom his stepmother was far from being agreeable. Though very uncomfortable at Oxford, Bentham went through the exercises of the college with credit and even with some dis-

tinction. Some Latin verses of his on the accession of George III. attracted considerable attention as the production of one so young. Into the disputations which formed a part of the college exercises he entered with much satisfaction; but he never felt at home in the university, of which he retained the most unfavorable recollection. In his old age he seldom spoke either of Westminster school or Oxford but with asperity and disgust. In 1763, while not yet 16, he took his degree of A. B. Shortly after he commenced eating his commons in Lincoln's Inn, but went back to Oxford to hear Blackstone's lectures. To these lectures he listened without the presumption, at that time, to set himself up as a critic, yet not without some occasional feelings of protest. Returning to London, he attended as a student the court of king's bench, then presided over by Lord Mansfield, of whom he continued for some years not only a great admirer, but a profound worshipper. Among the advocates, Dunning's clearness, directness, and precision most impressed him. He took his degree of A. M. at the age of 18, the youngest graduate, so says Dr. Southwood Smith, that had been known at either of the universities; and in 1772 he was called to the bar. Bentham's grandfather had been a Jacobite; his father, educated in the same opinions, had, like others of that party, transferred his sentiments of loyalty to the reigning family. The young Bentham had breathed from infancy, at home, at school, at college, and in the courts, an atmosphere conservative and submissive to authority. Yet in the progress of his law studies, beginning to contrast the law as it was with law such as he conceived it might be and ought to be, he came gradually to abandon the position of a submissive and admiring student, anxious only to make of the law a ladder by which to rise to wealth and eminence, for that of a sharp critic, an indignant denouncer, a would-be reformer. His father, who fondly hoped to see him lord chancellor, had some cases in nurse for him on his admission to the bar, and took every pains to push him forward. But it was all to no purpose. His temperament, no less than his moral and intellectual constitution, wholly disqualified him for success as a practising lawyer. He soon abandoned with disgust, to the infinite disappointment of his father, all attempts in that line. With a feeling in the highest degree distressing of having failed to fulfil the great expectations formed of him by his friends, and entertained by himself, he continued for years, to borrow his own words, "to pine in solitude and penury in his Lincoln's Inn garret," living on a very narrow income, drawn partly from some legacies, and partly from a small property conveyed to him by his father at the time of his second marriage. Still, however, he continued a diligent student and serious thinker, amusing himself with chemistry, then a new science, though mainly devoted to jurisprudence, but rather as it should be than as it was. The writings of Hume and Helvétius had led him to adopt utility as the basis of morals, and especially of legislation; and already he began to write down his ideas on this subject—the commencement of a collection of materials for and fragments of a projected but never completed code, which, for the whole remainder of his long life, furnished him with regular and almost daily employment. In the controversy between Great Britain and her American colonies, which became at this time a leading topic of public discussion, Bentham did not take any great interest. His tory education, and his idea of the law as it was, led him, unwarped, as he says, by connection or hopes, to favor the government side. In the arguments on behalf of the colonies, used on either side of the water, he saw nothing to change his mind. "The whole of the case," to borrow his own statement, "was founded on the assumption of natural rights, claimed without the slightest evidence of their existence, and supported by vague and declamatory generalities." Had the argument been placed on the ground of the impossibility of good government at such a distance, and the benefits that would accrue to both parties from a separation—grounds more in accordance with his ideas of the true basis of laws—it would then have attracted his attention. As it was, he had some hand, though small, in a book, "Review of the Acts of the 13th Parliament," published in 1775, by a friend of his, one John Lind, in defence of Lord North's policy. The next year he ventured to print a book of his own, under the title of "A Fragment on Government." He had contemplated a critical commentary on the commentaries of Blackstone, then lately published; but in this piece he confined himself to what Blackstone says of the origin of government. Rejecting the fiction of an original contract, suggested by Locke and adopted by Blackstone, he found government sufficiently warranted and justified by its utility; while in place of conformity to the laws of God and nature, which appeared to him to rest too much in vague assertion and opinion, he suggested "the greatest happiness of the greatest number" as a precise and practicable test of right and wrong, both in morals and laws. This pamphlet, for it was scarcely more, appeared anonymously, and attracted at first some attention. It was even ascribed to Mansfield, to Camden, and to Dunning. The impatient pride of Bentham's father having led him to betray the secret of its authorship, the public curiosity, which had been aroused by the work, not in its character of a philosophical treatise but of a personal attack, speedily subsided. A second pamphlet, published in 1778, a criticism, though on the whole a friendly one, on some amendments to the law of prison discipline, prepared in the form of a printed bill, with a preface by Mr. Eden (afterward Lord Auckland), assisted by Blackstone, did not attract much more attention. He was

also disappointed in an attempt which he made at this time to be appointed secretary of the commission sent out by Lord North to propose terms to the revolted American colonies. Meanwhile his writings, though neglected at home, yet served to make him known at Paris, whence he received letters addressed to him in the character of a philosopher and reformer from D'Alembert, Morellet, Chastellux, Brissot, and others. They also gained for him the acquaintance and friendship of Lord Shelburne, who in 1781 paid him a visit in his Lincoln's Inn garret. After much urging, Shelburne at length prevailed upon him to become a visitor at his country seat of Bowood. The ice once broken, Bentham became a frequent inmate there, and a great favorite, especially with Lady Shelburne. He was indeed more noticed by the ladies, whose musical performances he accompanied on the violin, than by Camden, Barré, and other great men of the day whom he met there. Still this introduction to Bowood was a great thing for Bentham. It raised him, as he himself expressed it, from the "bottomless pit of humiliation" into which he was fast sinking, and inspired him with new confidence in himself and new zeal for his favorite studies. He had also the additional excitement of falling in love. A very young lady whom he met there, whose frank simplicity was in strong contrast with the stiffness and prudery which was the prevailing style at Bowood, made an impression on his heart, which, though it did not result in marriage, yet lasted through life. Already before his acquaintance with Lord Shelburne he had printed part of an introduction to a penal code which he had undertaken to construct; but the unfavorable or lukewarm opinion of his undertaking expressed by Camden and Dunning, to whom Shelburne had shown the sheets, and by some other friends whom he consulted, joined to his ill success in finishing the work to his mind, long kept this printed fragment unpublished.—In 1785 he left England on a visit to his younger brother, then employed, with the rank of colonel in the Russian army, in the service of Prince Potemkin, in an abortive scheme, of which Krikov on the Don was the seat, for introducing English methods in manufactures and agriculture into that barbarous region. Furnished with funds by a maternal uncle, Bentham proceeded by way of Paris, his third visit thither, across the Alps to Leghorn. There he embarked in an English ship for Smyrna, and from Smyrna sailed in a Turkish vessel to Constantinople. After passing several weeks in that city, he travelled by land through Bulgaria, Wallachia, Moldavia, and the Ukraine, to his destination in White Russia. Here he spent a year and a half, living most of the time a very solitary life, occupied amid many annoyances and privations, among which was want of books, with his favorite studies. Tired out at last, in the absence of his brother, detained at Kherson by an expected attack from the Turks, he started for home by way of Poland, Germany, and Holland, and reached England in the spring of 1788. While residing at Krikov he had written his "Letters on Usury," occasioned by the report that the legal rate of interest was to be lowered. He sent the manuscript to England; his father caused it to be printed while he still remained absent, and it proved with the English public the most successful of his works. Renewing his visits to Bowood, he there met Romilly, whom he had known slightly before, and with whom he now formed an intimacy which lasted as long as Romilly lived. He now also first formed the acquaintance of the Swiss Dumont, who had been domesticated at Lord Shelburne's during his absence. Bentham had become so much disgusted at his failure to attract attention in England that he had adopted the idea of publishing in French, and had made some essays in that language. Romilly had shown some of these French sketches to Dumont, who, very much impressed by them, offered his services to correct and rewrite them with a view to publication. Another friend of Bentham's, with whom he had kept up a correspondence while absent in Russia, had written to him of Paley's success in applying the principle of utility to morals, and had urged him to set to work to complete some of his own treatises, or at least to publish the already printed part of his introduction to his unfinished penal code. These sheets, after lying in hand for eight years, were now at length published under the title of "An Introduction to the Principles of Morals and Legislation," but they attracted very little attention. Dumont, however, who about this time went to Paris and became connected with Mirabeau, aided to spread Bentham's reputation, and in the *Courrier de Provence*, of which he was one of the editors, gave publicity to some of his manuscripts. Meanwhile Bentham, with the idea of aiding the deliberations of the states general, then about to meet, drew up and printed, but did not publish, his "Parliamentary Tactics," and with the same object in view prepared and printed a "Draft of a Code for the Organization of the Judicial Establishment in France;" services which the national assembly recognized, by conferring on him the citizenship of France, in a decree (Aug. 23, 1792) in which his name was included with those of Priestley, Paine, Wilberforce, Clarkson, Mackintosh, Anacharsis Clootz, Pestalozzi, Washington, Klopstock, Kosciuszko, and several others. In this character of French citizen Bentham next year addressed to the national convention a new pamphlet, "Emancipate your Colonies," the first work which laid down the principle of ranking colonies as integral parts of the mother country.—While residing at Krikov, Bentham's attention had been attracted by an architectural idea of his brother's, who was a person of great mechanical genius, though like himself given to running from one thing to another without stopping to finish anything. This idea was that of

a circular building so constructed as that from the centre all the inmates could be overlooked. The younger Bentham had attempted to realize it with a view to the oversight of his Russian workmen. The elder brother seized upon it, in connection with his study of penal legislation, as applicable to prison discipline. He gave to this building the name of panopticon, and while still in Russia wrote a series of letters in explanation of its construction and its uses. These letters, after his return, were printed at Dublin by the Irish parliament, the adoption of his prison discipline scheme having been proposed there. In 1791 they were brought out at London, with additions, under the title of "Panopticon, or the Inspection House." In 1792 Bentham's father died, leaving him the family mansion in Queen's-square place, Westminster, where he chiefly resided for the rest of his life, and a freehold and leasehold property of between £500 and £600 a year. He left about an equal amount to the younger brother, who by this time had returned from Russia, and had zealously entered with his elder brother into the perfecting of the panopticon, with a view to applying it to prison discipline. Being now possessed of means, Bentham, in conjunction with his brother, submitted plans to Mr. Pitt for taking charge of 1,000 convicts, in a building to be erected for that purpose at the expense of the government, but—upon certain conditions, and at a certain rate of pay for each convict—to be under the entire control of the Benthams for their joint lives. Mr. Pitt, Mr. Dundas, Mr. Rose, and others, entered with much enthusiasm into the idea, and in 1794 an act of parliament authorized the contract. The Benthams obtained an advance from the treasury, and spent several thousand pounds of borrowed money on the strength of this arrangement, involving themselves thereby in great embarrassments, but from some mysterious cause could not get any further advances, nor a signature of the contract. The ministers, however, continued favorable, and made use of a parliamentary committee in 1797 to urge the completion of the contract, when at length the hitherto mysterious delay was explained, and the affair again brought to a standstill, by the refusal of the king to sign a treasury warrant for a sum of money needed to perfect the title to the land on which the building was to be erected, and for which considerable expenditures had already been made. George III. had taken an antipathy to Bentham, partly, as Bentham believed, from having looked into his treatise on the organization of the French judiciary, and partly because he had discovered him to be the author of two newspaper articles signed "Anti-Machiavel," and published in 1787, attacking the policy of a war with Russia, which the king had much at heart. Thirteen years more were spent in vain solicitations, till finally, in 1811, an act of parliament annulled the contract, and provided for the erection of a prison on a different plan, and at much greater expense to the public. In order to get a conveyance of the land, the imperfect title of which stood in Bentham's name, this act provided for an award on the question of damages, under which the Benthams three years after received the sum of £32,000. It may well be supposed that Bentham's experience in this matter could not but embitter him against the existing management of public concerns.—Meanwhile Dumont, having returned to England, had obtained from Bentham all his manuscripts, and had applied himself with zeal to the task of extracting from them and his printed works a vivid and popular statement, in French, of Bentham's system and ideas. This labor of love Dumont performed with remarkable success; and the first fruits of it, published at Paris in 1802, during the peace of Amiens, under the title of *Traités de législation civile et pénale*—a publication in which Talleyrand took a great interest, offering himself, if necessary, to bear the whole expense—speedily made Bentham known and famous throughout the continent of Europe as the philosopher of jurisprudence. In England, too, he acquired some new disciples and coöperators. Brougham joined Romilly in acknowledging his genius, and accepting many of his ideas. In 1808 he formed the acquaintance of James Mill, who, next to Dumont, did most to diffuse his doctrines. Mill lived for several years, a large part of the time, in Bentham's house, who still labored away some six or eight hours daily on his codes, stopping, however, as occasion offered, to launch forth vehement attacks on the English system of jurisprudence. Such were his "Scotch Reform compared with English Non-Reform," published in 1808, and his "Elements of the Art of Packing as applied to Special Juries," printed in 1808, but which he was dissuaded by Romilly from publishing, lest it might expose him to a prosecution for libel. Some difficulty was even met with in finding a publisher for the "Rationale of Judicial Evidence," edited by Mill from Bentham's manuscripts, lest that, too, especially the part of it assailing the whole technical method of English judicial procedure, might be regarded as a libel on the administration of justice. This work, indeed, did not appear till 1827, when it was published in 5 vols. 8vo. Confirmed, meanwhile, by his growing reputation, in his always strong interior faith in himself, Bentham became anxious to bring out, not as a mere draft, but as an actual body of law, his ideal code, on which he had been laboring all his life, but which yet existed only in his brain and in an immense mass of fragmentary manuscripts. He had hoped, on the strength of promises from Miranda, to become the legislator of Venezuela, to which country he had even thoughts of removing. But Miranda's project failed. In 1811—Dumont having in that year brought out a new French work, edited from his manuscripts, *Théorie des peines et des récompenses*—he addressed an elaborate letter to President Madison, offering,

upon the receipt of a letter importing the president's approbation, and, as far as depended upon him, acceptance of his proposition, to forthwith set about drawing up for the use of the United States, or such of them as might accept it, "a complete body of law; in one word, a pannomion, or as much of it as the life and health of a man, whose age wanted little of four and sixty, might allow of," asking and expecting no reward beyond the employment and the honor of it. This letter, besides a sketch of his plan, which embraced not merely the text of a code, but a perpetual running commentary of reasons, included also a vigorous attack upon the existing system of English and American jurisprudence, and an answer to certain anticipated objections, both to the plan and to himself as legislator. Mr. Brougham wrote at the same time to some American friends, expressing his opinion that no person in Europe was so capable as Bentham of such a task. No answer had been received to this letter when, in 1814, Mr. Gallatin was a little while in England, in his capacity of commissioner, to treat for peace. Not only had Gallatin received from Dumont, who was his countryman, a presentation copy of the *Traités de législation*, but he had, as he told Bentham, who had an interview with him, been his disciple for 25 years, in consequence of having read, soon after its publication, a copy of the "Introduction to the Principles of Morals and Legislation," put into his hands by Col. Burr. We may mention by the way that Burr himself, when in England six years before, had obtained an introduction to Bentham from Dumont, and had even passed a considerable time under his roof—one object of Bentham doubtless being to avail himself of Burr's knowledge of American affairs. In consequence of this interview with Gallatin, Bentham was led, in a letter to Governor Snyder of Pennsylvania, enclosing a printed copy of his letter to Madison and a letter of introduction from Gallatin, to renew his offer of himself as a codifier. At length, in 1816, Madison returned a courteous reply to Bentham's letter of 1811, referring to the intervening war as an apology for his long silence, stating that a compliance with Bentham's proposals was "not within the scope of his proper functions," suggesting some obstacles to the proposed codification, and objections to it, but fully admitting the desirability of such a reform. This letter was conveyed to London by J. Q. Adams, appointed American minister to England, and who became during his residence there intimate with Bentham. When Adams returned home in 1817, to assume the office of secretary of state, he became the bearer of a circular letter, addressed by Bentham to the governors of the states, accompanied by copies of the letter to Madison, and a renewal of his offer of himself as legislator. Bentham's proposals, which he followed up by a series of short letters on the same subject, addressed to the people of the states, were laid before the legislatures of Pennsylvania and New Hampshire. He received appreciative letters from Governors Snyder and Plumer of those states, but nothing further resulted. Several years later, Edward Livingston sent him a copy of his draft of a penal code for Louisiana, with strong expressions of admiration for his genius, and acknowledgments of the instruction received from the study of his works. Meanwhile, in 1814, Bentham had made an offer of his legislative aid to the emperor of Russia, in the language of which country two translations had appeared of the *Traités de législation*, one of them, it was said, by the special procurement of the government. The emperor replied in a letter written by his own hand, in which he promised to submit Bentham's proposal to the commission at work on a code for the empire. He sent at the same time a valuable ring, which Bentham returned, sending with it a second letter, in which he gave reasons why nothing could be expected to come of the reference of his proposals to a commission which, in one shape or another, had been in session for more than a century without any result. In the expectation that Prince Adam Czartoryski, who was one of his disciples, would be appointed regent of Poland, he had hopes of legislating for that country; but another person was appointed, and this hope failed. The revolutions in 1820, which established liberal governments in the Spanish peninsula, gave Bentham new and stronger hopes. Dumont's compilations had been translated into Spanish, and were well known to the leading liberals of Spain and Spanish America. The Portuguese cortes caused them to be translated into Portuguese. In 1822 he published also his "Codification Proposal," addressed to all nations professing liberal opinions, tendering his services as legislator, and arguing in favor of a code emanating from a single mind. He was consulted on the Spanish penal code, on which in 1822 he published some letters addressed to the conde de Toreño; and similar applications were made to him from Spanish America. But the downfall of liberalism in the peninsula, and the protracted civil wars in the late Spanish colonies, disappointed his expectations in that quarter.—While thus seeking the office of legislator, another idea had engrossed much of his attention. He had taken a great interest in the educational system of Bell and Lancaster, and in 1817 he had published, under the title of "Chrestomathia," a proposal to apply this system to the higher branches of education. There was even a scheme for erecting a building in his garden on the panopticon system, in which the experiment was to be tried; but, like so many other of his plans, it did not go on.—Though Bentham had always boasted of being a man of no party, as well as of all countries, he had come at length to occupy at home the position of a party chief. He espoused with characteristic zeal and en-

thusiasm the ideas of the radicals, who now first appeared as a political party. He went indeed the full length, not merely of republicanism, but on many points of democracy. He wrote pamphlets and drew up plans in behalf of parliamentary reform and other movements of the radicals, and became a sort of spiritual head of the party. It was he who furnished the money to set up the "Westminster Review," established in 1823 as the organ of the radicals. The political editor was Mr. Bowring (afterward Sir John Bowring), with whom Bentham had formed an acquaintance through their mutual interest in the Spanish liberal movement. That acquaintance speedily ripened into a very close intimacy and friendship, which lasted to the end of Bentham's life. His connection with the radicals, and his vehement attacks on law abuses and the lawyers, had rather cooled off Lord Brougham, but in his place Bentham acquired a new disciple and pupil in the person of Daniel O'Connell. Mr. Peel, in his movements in the house of commons for the amendment of the criminal law, seemed to be starting in Bentham's direction. Bentham even entertained the hope that he might persuade the duke of Wellington, with whom he corresponded, to undertake, in addition to Catholic emancipation, those reforms in the administration of justice which Cromwell had attempted, but in which the lawyers had baffled him.—The acknowledgment of his genius by the most eminent men of his times, his world-wide reputation, and the share he was now taking in the actual movement of affairs, more than made up for the sneers, to which, indeed, he paid no attention, cast at him as a visionary schemer; and the satisfaction and even gayety of the latter part of his life formed a strong contrast with the gloom of his youth and early manhood. In his last ten years he seldom left his own home, taking exercise in his garden. He retained to the last his love of music, of pet animals, cats particularly, and of flowers, but spent regularly six or more hours a day in composition, employing generally two secretaries. He saw no company except at dinner. His hour of dining was 7; his table was delicately spread, but admission to it, though he generally had two or three guests, was only obtained as a particular favor. Dinner was followed by music on the organ. He was of a gay and lively temper, hopeful, enthusiastic, and in spirit young to the last. His last published work was his "Constitutional Code," of which a volume appeared in 1830. At the time of his death he was engaged with Bowring in an attempt to present his fundamental ideas in a more popular form. This work was published in 1834, after his death, under the title of "Deontology." Bentham gave a practical exemplification of his principles by bequeathing his body to his friend Dr. Southworth Smith, for the purpose of dissection. A collection of his works, in 11 vols. 8vo, published at Edinburgh under the supervision of Bowring, his executor, was completed in 1843. It includes, at the end, a memoir made up principally of letters and of Bentham's reminiscences, as noted down by Bowring, very badly put together, but containing a great deal of interesting matter. Dumont, just before his own death, edited and published at Brussels, in 1828, a complete collection of his compilations from Bentham in 6 double volumes, demi-octavo. A translation into English by Richard Hildreth of the *Traités de législation* was published at Boston in 1840, under the title of "Theory of Legislation." It is from this work (a translation of which, with some additions from Bentham's manuscripts, is included in Bowring's edition of Bentham's works) that the general reader will best obtain a knowledge of Bentham's system.—In his earlier writings, and in many of his pamphlets, Bentham expresses himself with great terseness and energy, but in his didactic works he often loses himself in parentheses, and protracts his sentences to a tedious length. In his later writings he sacrificed everything to precision, for which purpose he employed many new words, some of which, such as international, codify, codification, maximize, minimize, &c., have become permanent additions to the language. His analysis of human nature, on which he based his system, can hardly rank him high as a metaphysician; his employment of the exhaustive method of reasoning frequently led him into useless subdivisions and unnecessary refinements; but he had a very acute intellect, a thorough devotion to truth, and a strong spirit of benevolence, unwarped by any selfish or party views. Unawed by authority, he appealed to reason alone, and, having devoted his whole life to the study of jurisprudence, his works abound with suggestions and ideas as novel as they are just. "Nobody has been so much plundered as Bentham," said some one to Talleyrand. "True," he replied; "yet how rich he still is." In the improvements introduced of late years into the administration of the law, both in England and America, many of his suggestions have been followed, often without acknowledgment, or even knowledge perhaps, of the source whence they originated. There are many more of his ideas that may yet be put to use. The 4th part of his treatise on the penal code, as published by Dumont, of which the subject is the indirect means of preventing offences, contains a mine of wisdom, which legislative bodies might explore with advantage.

BENTHAM, Thomas, an English bishop, born in Sherburn, Yorkshire, in 1513, died in 1578. He was deprived of a fellowship at Magdalen college, Oxford, in 1553, for knocking the censer out of the hands of the officiating priest at mass, "in order to prevent incense being offered to idols." He then travelled on the continent, preached at Basel to the English exiles, and returning to England before the close of Mary's reign, ministered privately to a Protes-

tant congregation in London, where he nearly involved himself in fresh difficulties by his boldness of speech. On the accession of Elizabeth he was appointed to the pulpit of Paul's Cross, and in 1559 to the see of Lichfield and Coventry. He published an exposition of the Acts of the Apostles, and translated into English some parts of the Old Testament.

BENTINCK, an English noble family, with extensive connections in Germany and Holland. —William, son of the lord of Diepenheim, in Overyssel, Holland, was page and afterward confidential adviser to William of Orange, who in 1689, on becoming king of England, made him earl of Portland. He was prominent in the battle of the Boyne and in the peace of Ryswick, and died Nov. 23, 1709.—His son Henry was in 1716 made duke of Portland, and died in Jamaica, of which he was governor and captain general, July 4, 1726.—William, second duke, born in 1708, married Margaret Cavendish, only daughter and heir of the second earl of Oxford, and died May 1, 1762.—William Henry Cavendish, third duke, born April 14, 1738, died Oct. 30, 1809. He was twice prime minister under George III. (1783 and 1807–'9), and viceroy of Ireland for a short time in 1782.—William Charles Cavendish, second son of the preceding, born Sept. 14, 1774, died in Paris, June 17, 1839. Entering the army at an early age, he served in Flanders with the duke of York, and was colonel before he was 21. In 1799 he joined the Russian army under Suvaroff in Italy, where he continued in active service till 1801; went out to India as governor of Madras in 1803; was made major general on his return in 1805; was sent on a mission to the Spanish court in 1808, relative to the French invasion of Spain; commanded a brigade under Sir John Moore at Corunna, in January, 1809; went to Sicily in 1810, as plenipotentiary and commander-in-chief of the English troops there; bestowed a constitution on that island in 1812; conducted the expedition from Sicily to Catalonia in 1813, to operate in the rear of the French armies, but was compelled to make a hasty retreat; took possession of Genoa in 1814, when the inhabitants revolted from the French, and threw up his commission in disgust when the Genoese (who claimed the reëstablishment of their republic under England, under the convention which had been made) were given over to Piedmont. By this time he was lieutenant general. Returning to England, he was elected member of parliament for Nottingham, and voted with the liberal party. He was subsequently raised to the rank of full general, and was in 1827, under the government of Mr. Canning (a family connection by marriage), sent to India as governor general, in which capacity he continued till 1835, when ill health compelled him to resign. The results of his Indian rule were: the reduction of the *batta* (allowances made to the troops on the march), much to the discontent of the army; the abolition of flogging among the native troops, British soldiers serving in the same country remaining subject to it; the prohibition of the suttee, or burning alive of the widow on the funeral pile of her husband; the granting Englishmen leave to settle in India, though not belonging to the military or civil service; the upholding of the native population as far as possible; and the protection of the liberty of the press. Some of these alterations were made by order of the East India directors in England, and some were carried out contrary to the wish of the directors. In 1834 he made war on the rajah of Coorg, annexed his territory, and pensioned him off. When he quitted India, the natives, who had looked upon him as the best friend they had had since the time of Warren Hastings, expressed their regret at a public meeting in Calcutta, and testified their respect by erecting an equestrian statue of him. He reëntered the house of commons in 1836, for the city of Glasgow.—George Frederick Cavendish, known as Lord George Bentinck, third son of the fourth duke of Portland, born Feb. 27, 1802, died unmarried Sept. 21, 1848. He rose to the rank of major in the army, became private secretary of Canning, who had married his aunt, and was member of parliament for King's Lynn from 1827 till his death. He voted in favor of the Catholic relief bill of 1829, supported Lord Grey's reform bills, and denounced the alliance between O'Connell and the whigs, which he termed the Lichfield house compact, and which drove from office Sir Robert Peel, whom he had zealously supported. In 1846, when that statesman announced his intention to favor the repeal of the corn laws, Lord George, who had always been regarded as a silent member, made a powerful speech which placed him at once at the head of the protectionists, and he was for the rest of his life the first man on the opposition side in the commons. Mr. Disraeli was his disciple, and afterward became his biographer (1851). Lord George was a famous patron of the turf. —The still existing junior branch of the Bentinck family was founded by William (1701–'73), the eldest son of William Bentinck, the first earl of Portland, by the father's second marriage with Lady Berkeley. He became lord of Rhoon and Pendrecht, president of the states of Holland and West Friesland, was raised to the rank of count of the empire, and by his marriage with Carlotta Sophia, only daughter and heir of Anthony II., the last count of Aldenburg, he came into possession of the latter's extensive entails, including those in Oldenburg. By his descendants this younger Dutch branch of the Bentincks was split into various branches on the continent and one in England. Count William Christian Frederick (1787–1855) was chamberlain to the king of Holland. His brother Charles Anthony Ferdinand (1792–1864) acquired distinction as lieutenant general in the English army, and Sir Henry John William, another

brother, born Sept. 8, 1796, as general in the Crimea.

BENTIVOGLIO, the name of an Italian family once sovereign in Bologna, and claiming descent from a natural son of the emperor Frederick II. Giovanni was proclaimed lord of Bologna in 1401, but was expelled and killed the next year. Annibale, his grandson, was placed at the head of the government there in 1438, and was murdered by a rival faction in 1445. Giovanni, his son, was for 44 years at the head of the commonwealth, adorned Bologna with several fine buildings, and collected many manuscripts, paintings, and statues. In 1506 he fled with his family to the Milanese territory to escape the army of Pope Julius II., and died in 1508. The French placed his two sons at the head of affairs in 1511, but in 1512 Bologna again surrendered to the pope, and the Bentivoglios emigrated to Ferrara. Several members of the family afterward attained distinction. **I. Ercole,** grandson of Giovanni, born in Bologna in 1506, died in Venice, Nov. 6, 1573. He lived in Ferrara, and was employed in diplomatic affairs by the princes of Este. He wrote several satires and comedies, and was distinguished as a lyric poet. His poetical works were published in Paris in 1719. **II. Guido,** born in Ferrara in 1579, died Sept. 7, 1644. In 1621 he was created cardinal, was nuncio to France, and after his return was intrusted by Louis XIII. with the care of French affairs in Rome. He was the chief adviser of Pope Urban VIII., whose successor it was generally believed he would be; but he died at the opening of the conclave. He left several works, of which a complete edition was published in Venice in 1668; among them were letters and memoirs, "A History of the Civil Wars of Flanders," and "An Account of Flanders." **III. Cornelio,** born in Ferrara in 1668, died in Rome, Dec. 30, 1732. Under Clement XI. he was archbishop of Carthage and nuncio at Paris, where he showed great zeal in behalf of the bull *Unigenitus*, in consequence of which he received many favors from Louis XIV. He was created cardinal in 1719, and was afterward nuncio in Spain. He was a patron of literature, and was learned in the law and sciences, as well as in theology.

BENTLEY, Richard, an English scholar and critic, born at Oulton, near Wakefield, Jan. 27, 1662, died July 14, 1742. He was entered as a sizar at St. John's college, Cambridge, at the age of 14, graduated with honors corresponding to those of third wrangler in the present system, and in 1682 was appointed by his college to the head mastership of Spalding grammar school, which he quitted after a year for the situation of domestic tutor to the son of Dr. Stillingfleet, then dean of St. Paul's. He accompanied his pupil to Oxford in 1689, and there pursued his own studies in the Bodleian library, especially in the oriental languages. His first publication, in 1691, a Latin epistle to Dr. John Mill on an edition of the "Chronicle" of John Malala, at once established his reputation as a scholar and a critic. He took holy orders in 1690, and in 1692 obtained the first nomination to the lectureship just founded under the will of Robert Boyle, in defence of religion against infidels. In October of the same year he was appointed a prebendary at Worcester; in April, 1694, keeper of all the king's libraries, and Boyle lecturer for a second time; in 1695 one of the chaplains in ordinary to William III.; and in 1696 he took the degree of D. D. at Cambridge, and assisted his friend Grævius in preparing an edition of Callimachus. Charles Boyle (afterward earl of Ossory) published a new edition of the "Epistles of Phalaris" early in 1695, and complained in his preface of some alleged want of courtesy on the part of Bentley respecting the loan of a manuscript in the king's library. Bentley courteously assured Boyle that his statement was erroneous, and expected the complaint to be withdrawn; but this was not done, and he took his revenge two years later, when, in an appendix to the second edition of Wotton's "Reflections upon Ancient and Modern Learning," he published his "Dissertation upon the Epistles of Phalaris, Themistocles, Socrates, Euripides, and others, and the Fables of Æsop," demonstrating the spuriousness of all these productions, and dissecting Mr. Boyle's labors with contemptuous severity. The leading scholars of Oxford, headed by Atterbury, united in a reply to Bentley, which was published in 1698, with the name of Charles Boyle on the title page. Pope, Swift, and Gay joined in the controversy. General opinion set strongly against Bentley, who was disliked for his arrogance; but in 1699 Bentley issued that immortal dissertation, as it was called by Porson, in which he disposed of the question at once and for ever, with a splendid display of learning, skill in argument, and no slight wit. To this dissertation a rejoinder was promised, but never appeared. Early in 1700, at the age of 38, Dr. Bentley was made master of Trinity college, Cambridge, an office of large emolument and vast responsibility. In January, 1701, he married Joanna, daughter of Sir John Bernard, a baronet in Huntingdonshire. In the same year he was made archdeacon of Ely. As actual head of the university of Cambridge, he introduced many necessary reforms, put the university press on a better footing than before, encouraged scholars and scholarship, improved the discipline of his college and the modes of examination for scholarships and fellowships, and extended the college library. Many abuses which he reformed were supported by the fellows of his college, from whose society he kept aloof, and his general conduct, even when morally and legally correct, was arbitrary. In 1709 the vice master of Trinity and some of the senior fellows accused him of malappropriation of the college funds. Out of this arose a long litigation, in which Bentley, supported somewhat by the junior fellows, but more strongly by his own determination, bold-

ness, and adroitness, succeeded in keeping his office after sentence of deprivation had been pronounced against him, and retained it until his death. In 1717 the regius professorship of divinity at Cambridge, by far the richest in Europe, became vacant. Bentley, notwithstanding the doubt whether, as master of Trinity, he could also hold that office, procured himself to be elected. His opening lecture treated of the text (1 John v. 7) on the three heavenly witnesses. He maintained the doctrine of the Trinity, but decidedly rejected the verse, of which he gave the history. When George I. visited Cambridge, and several persons were nominated to the degree of D. D., Bentley exacted four guineas from each candidate in addition to the usual fees. For this he was tried in the court of the vice chancellor of the university, degraded, and deprived of all his degrees, in October, 1718. He appealed to the law, and after more than five years' litigation the court of king's bench issued a mandamus compelling the university to reinstate him.—Amid all these litigious and troublesome years Bentley pursued his scholastic labors as eagerly as if nothing else had been on his mind. After publishing the appendix to the Chronicle of Malala he began to prepare editions of Philostratus, of Hesychius, and of the Latin poet Manilius; but the Philostratus, though ready for the press, never appeared, nor is it known what has become of it. In 1695 he assisted Evelyn in the revision of his *Numismata*. In 1696 he wrote the notes and made the emendations of the text of Callimachus. He wrote in 1708 three critical epistles on the "Plutus" and the "Clouds" of Aristophanes, to assist his friend Ludolf Küster in his edition of that poet. In 1710 he prepared emendations on 323 passages in the "Fragments of Menander and Philemon," which had been edited, but with great ignorance of Greek, by Le Clerc. In 1711 he completed his edition of Horace, the most popular of all his publications. In 1713 he replied to Anthony Collins's "Discourse on Free Thinking." In 1716 he proposed, in a letter to Archbishop Wake, to restore the original text of the New Testament, exactly as it was at the time of the council of Nice, using the Vulgate to correct the Greek text. The project, which was severely attacked by Dr. Conyers Middleton, was never proceeded with. In 1726 he published annotated and revised editions of Terence and Phædrus. Toward the close of 1731 he undertook his edition of "Paradise Lost," and published it, with notes and corrections of the text, in January, 1732. It has some marks of ability, but, as a whole, is not worthy of his pen. In 1726 he had noted and corrected the whole of Homer, chiefly with a view to the restoration of the digamma to its place and functions in the metre. In 1732 he seriously applied himself to complete this edition. It was never published, but the MS. was finally transmitted to Göttingen by Trinity college, for the use of Heyne, who in his own edition of Homer acknowledged the profoundest obligations to it, and made the world circumstantially acquainted with its merits. Fourteen years after Bentley's death Horace Walpole published at his private press an edition of Lucan, illustrated by the notes of Bentley, combined with those of Grotius. The suggestions contained in it for the emendation of the text are excellent.—Bentley had an overweening opinion of his own dignity and rights, and a determination in upholding both, which opposition only increased. In private, though his manner was stately, if not severe, he is represented as having been amiable. He was perhaps the best classical scholar England has ever produced. By the close attention to verbal details, of which he set an example, the facts have been collected upon which the modern science of comparative philology is founded. His life, by Dr. J. H. Monk, first bishop of Gloucester and Bristol (4to, 1830), is an elaborate production, leaning rather against Bentley.

BENTLEY, Robert, an English botanist, born at Hitchin, Herts, in 1823. He early became a member of the royal college of surgeons, and subsequently professor of botany in King's college, London, as well as of materia medica and botany to the pharmaceutical society of Great Britain, dean of the medical faculty, and president of the British pharmaceutical congress in 1866 and 1867. He applies botany to medicine, was one of the editors of Pereira's "Manual of Materia Medica and Therapeutics," and has published a "Manual of Botany," which recently reached a second edition.

BENTON, the name of counties in eight of the United States. **I.** A W. central county of Mississippi, bordering on Tennessee, bounded S. W. by the Tallahatchee river, and watered by Tippah creek and Wolf river; organized since the census of 1870. According to state reports, the county in 1870 produced 3,030 bales of cotton. The Mississippi Central railroad passes through the N. W. corner. **II.** The N. W. county of Arkansas, bounded N. by Missouri and W. by the Indian territory; area, 900 sq. m.; pop. in 1870, 13,831, of whom 182 were colored. It is watered by the White and Illinois rivers and affluents of the Neosho and Elk. The chief productions in 1870 were 84,779 bushels of wheat, 340,046 of Indian corn, 40,569 of oats, 35,280 lbs. of tobacco, 13,740 of wool, and 20,132 gallons of sorghum molasses. There were 4,336 horses, 829 mules and asses, 3,337 milch cows, 540 working oxen, 2,978 other cattle, 7,987 sheep, and 24,202 swine. Capital, Bentonville. **III.** A N. W. county of Tennessee, bounded E. by the Tennessee river and N. W. by the Big Sandy; area, 400 sq. m.; pop. in 1870, 8,234, of whom 452 were colored. The Nashville and Northwestern railroad passes through the county, and the N. W. corner is crossed by the Memphis and Louisville railroad. The soil is good. The chief productions in 1870 were 25,753 bushels of wheat, 357,403 of Indian corn, 412,435 lbs.

of tobacco, 10,288 of wool, 25,692 gallons of sorghum molasses, and 696 bales of cotton. There were 1,747 horses, 819 mules and asses, 2,028 milch cows, 1,075 working oxen, 2,719 other cattle, 7,790 sheep, and 20,016 swine. Capital, Camden. **IV.** A W. county of Indiana, bordering on Illinois, watered by Pine and Sugar creeks; area, 414 sq. m.; pop. in 1870, 5,615. The surface is mostly fertile prairie, and about one fifth of it is covered with forests of oak, ash, sugar maple, and walnut. The chief productions in 1870 were 50,513 bushels of wheat, 458,857 of Indian corn, 121,842 of oats, 6,659 tons of hay, and 20,097 lbs. of wool. There were 3,115 horses, 314 mules and asses, 1,906 milch cows, 8,248 other cattle, 5,143 sheep, and 8,566 swine. Capital, Oxford. **V.** An E. central county of Minnesota, bounded W. by the Mississippi river; area, 400 sq. m.; pop. in 1870, 1,558. Little Rock, Elk, and St. Francis rivers, and a branch of Rum river drain the county. A branch line of the St. Paul and Pacific railroad passes through the S. W. corner, and a line is in progress from Sauk Rapids running N. through the county to connect with the Northern Pacific railroad. The chief productions in 1870 were 3,541 bushels of wheat, 5,036 of Indian corn, 7,672 of oats, and 1,535 tons of hay. There were 99 horses, 217 milch cows, 331 other cattle, 261 sheep, and 168 swine. Capital, Sauk Rapids. **VI.** An E. central county of Iowa, drained by Cedar and Iowa rivers; area, 720 sq. m.; pop. in 1870, 22,454. The Chicago and Northwestern, and the Burlington, Cedar Rapids, and Minnesota railroads traverse the county. The surface is undulating and occupied by prairies and woodlands. Fine building stone abounds. The chief productions in 1870 were 1,254,947 bushels of wheat, 1,516,420 of Indian corn, 468,543 of oats, 68,103 of barley, 98,133 of potatoes, 32,473 tons of hay, 18,674 lbs. of wool, and 570,126 of butter. There were 8,878 horses, 394 mules and asses, 8,000 milch cows, 10,158 other cattle, 6,127 sheep, and 21,921 swine. Capital, Vinton. **VII.** A W. central county of Missouri, intersected by the Osage and its branches, the Pomme de Terre and Grand rivers; area, 770 sq. m.; pop. in 1870, 11,322, of whom 320 were colored. The surface, which is somewhat uneven, is occupied by alternate tracts of fertile prairie and woodland. Lead is the most important mineral. The chief productions in 1870 were 122,852 bushels of wheat, 358,959 of Indian corn, 120,918 of oats, 36,238 lbs. of tobacco, 30,238 of wool, and 25,896 gallons of sorghum molasses. There were 5,825 horses, 1,035 mules and asses, 4,780 milch cows, 955 working oxen, 7,928 other cattle, 15,685 sheep, and 17,991 swine. Capital, Warsaw. **VIII.** A W. county of Oregon, bordering on the Pacific, and bounded E. by the Willamette river; area, 1,200 sq. m.; pop. in 1870, 4,584. The surface is mountainous, and the soil fertile and suited to agriculture and grazing. The chief productions in 1870 were 196,598 bushels of wheat, 2,343 of Indian corn, 146,235 of oats, 3,124 of flaxseed, and 68,970 lbs. of wool. There were 2,263 horses, 2,665 milch cows, 3,564 other cattle, 12,957 sheep, and 8,081 swine. Capital, Corvallis.

BENTON, a post village of Lafayette county, Wisconsin, 13 m. N. of Galena, Ill., in a region abounding in lead mines, which are extensively worked; pop. in 1870, 1,723. It contains smelting furnaces and several churches.

BENTON, Thomas Hart, an American statesman, born near Hillsborough, Orange co., N. C., March 14, 1782, died in Washington, April 10, 1858. His father died when he was eight years old, and he enjoyed few advantages of education. His mother having removed to Tennessee, he studied law there, and was elected to the legislature, where he obtained the passage of a law for the reform of the judicial system of the state, and another by which the right of trial by jury was given to slaves. In the war of 1812 he served as aide-de-camp to Gen. Jackson, and also raised a regiment of volunteers, by which he acquired the title of colonel. His friendly relations with Gen. Jackson were broken off by a quarrel and a personal conflict, and they remained enemies for many years. When peace was declared in 1815 Col. Benton took up his residence in St. Louis, resumed the practice of the law, and soon afterward established the "Missouri Inquirer," by which he involved himself in several duels, in one of which he killed his opponent, Mr. Lucas. The "Inquirer" urged the admission of Missouri with a slavery constitution, and after the establishment of the state government Col. Benton was chosen United States senator in 1820. In 1824, 1826, and 1828 he advocated the granting of preëmptive rights to actual settlers, a periodic reduction in the price of public land proportioned to the time that it had been in the market, and a donation of homesteads to certain persons. He presented a bill embracing these features, and renewed it every year, until it took hold upon the public mind, and was at length substantially embodied in one of Gen. Jackson's messages, which secured its final adoption. Col. Benton also caused the adoption of a bill throwing the saline and mineral lands of Missouri which belonged to the United States open for occupancy. In the session of 1829–'30 he delivered an elaborate argument against the salt tax, and followed it up with such success that the tax was repealed. He was one of the earliest advocates of a railroad to the Pacific. He favored the opening of trade with New Mexico, the establishment of military stations in Missouri and throughout the interior, and the cultivation of amicable relations with the Indians. When the charter of the United States bank expired, Col. Benton urged the adoption of a gold and silver currency as the true remedy for the embarrassments of the times. It was from the financial policy enunciated in his

speeches on this topic that he obtained the sobriquet of "old Bullion." He was the mover of the famous "expunging resolutions," by which, after a great struggle, the minute of the vote censuring Gen. Jackson was expunged from the journals of the senate (1837). During Mr. Van Buren's administration Col. Benton defended the new financial policy then just introduced. From 1841 to 1852, under the administrations of Tyler, Polk, and Taylor, he participated in the discussions that arose in regard to the Oregon boundary, the annexation of Texas, and other important subjects. The democratic administration of Mr. Polk was in favor of lat. 54° 40′ N. as the boundary of Oregon, but was opposed with so much force by Col. Benton, that Mr. Polk acquiesced in his views and accepted lat. 49° N. as the line. During the Mexican war the policy of a "masterly inactivity," at first determined upon by the president, was abandoned upon the recommendation of Col. Benton, and that of a vigorous prosecution of the war adopted in its stead. At one time it was proposed by President Polk to confer upon him the title of lieutenant general with full command of the war, in order that he might carry out his conceptions in person. Questions in regard to slavery were brought on by the acquisition of Mexican territory. These were adjusted by the compromise acts of 1850, which were introduced by Mr. Clay. They were opposed by Col. Benton and defeated as a whole, but passed separately. In the controversy and quarrel between Gen. Jackson and Mr. Calhoun, Col. Benton had been upon Gen. Jackson's side. Mr. Calhoun having propounded the doctrine of nullification, Col. Benton became his most formidable democratic opponent in the senate. They became bitter enemies, and their hostility lasted as long as they lived. The Calhoun doctrine was introduced into the discussion of the abolition petitions in the house of representatives in 1835. It was definitely presented in the session of 1846–'7. On Feb. 19, 1847, Mr. Calhoun, in answer to the "Wilmot Proviso," which excluded slavery from all territory subsequently to be acquired, introduced resolutions which embodied his doctrine as to state rights. Col. Benton denounced them as "firebrand resolutions." They never came to a vote in congress, but were adopted by the legislatures of some of the slave states and made the basis of political action; and the legislature of Missouri made them the basis of instructions to the senators of the state. When the instructions were received by Col. Benton he denounced them as containing disunion doctrines and as not expressing the true sense of the people. Upon the adjournment of congress he immediately returned to Missouri and canvassed every section of the state in a series of speeches famous for their bitterness of denunciation, strength of exposition, and caustic wit. The legislature of 1849–'50 was largely democratic, but Col. Benton, as a candidate for senator, was defeated by a coalition between his democratic opponents (known as "anties") and the whigs. At the close of his term he therefore retired from the senate, after six successive elections and 30 years' continuous service, during all of which time he had been one of the most prominent and active members. In 1852 he was elected to the house of representatives, where he at first sustained the administration of President Pierce; but when the Calhoun party obtained the ascendancy he withdrew his support. He made a memorable speech in opposition to the Kansas-Nebraska bill, but the bill was passed, and at the next election he lost his seat in congress. He then devoted two years to study and literary pursuits, and in 1856 canvassed the state as a candidate for governor. He was received with great popular enthusiasm, but a third ticket, nominated by the "Native Americans," drew off so many votes from him that Mr. Trusten Polk (national democrat) was elected by a small plurality. In the presidential election of the same year Col. Benton supported Mr. Buchanan in opposition to his own son-in-law, Col. Fremont.—After Col. Benton's defeat he resumed his literary pursuits. The first volume of his "Thirty Years' View" of the working of our government had been published in 1854. The second and last appeared in 1856. He then undertook the task of condensing, revising, and abridging the debates of congress from the foundation of the government. Although at the advanced age of 76, he labored at this task daily. He lived long enough to bring the work down to the conclusion of the great compromise debate of 1850, in which, with Clay, Calhoun, Webster, and Seward, he had himself borne a conspicuous part, the last pages being dictated in whispers after he had lost the power of speaking aloud. It was published under the title of "An Abridgment of the Debates of Congress from 1789 to 1856" (15 vols. 8vo., New York).

BENTZEL-STERNAU, Christian Ernst, count, a German author and statesman, born at Mentz, April 9, 1767, died in Switzerland, Aug. 13, 1850. He entered public life in 1791 as councillor of the electorate of Mentz at Erfurt, and in 1812 was appointed minister of state and finance of the recently established grand duchy of Frankfort. When this was abolished in 1814 he retired to Switzerland, and resided there the rest of his life. He was an opponent of the privileges of the clergy and hereditary nobles, and became a Protestant in 1827. He wrote a great number of romances, some poetry, and a few plays, and was editor of the *Jason* from 1808 to 1811. The first of his romances which attracted attention was *Das goldene Kalb* (4 vols., Gotha, 1802–'4). Among the most noted of his other novels were *Der steinerne Gast* (4 vols., 1808) and *Der alte Adam* (4 vols., 1819–'20). His novels are satirical and humorous.

BENZIE, a N. W. county of Michigan, on Lake Michigan; area, 440 sq. m.; pop. in 1870,

2,184. Crystal lake, a large body of water, is situated in the W. part. The chief productions in 1870 were 8,906 bushels of wheat, 15,079 of Indian corn, 48,263 of potatoes, 658 tons of hay, and 40,508 lbs. of maple sugar. Capital, Benzonia.

BENZINE, or **Benzene,** a light oil of petroleum. Mitscherlich in 1833 obtained an oil by the distillation of benzoic acid with an excess of caustic lime, to which he applied the name of benzine. The same body had been discovered by Faraday in 1825, and named by him bicarburetted hydrogen. Liebig, in reprinting Mitscherlich's article in his *Annalen*, objected to the termination *in*, and changed it into *ol*, and thus introduced the new name benzol. For a long time therefore benzin and benzol were used synonymously by different authors—the French adhering to Mitscherlich and calling the substance benzine, while the English called it benzole. After the discovery of petroleum the word benzole or benzine was applied to a liquid of a totally different chemical constitution, though analogous in some of its properties. As soon as it was ascertained by careful chemical analysis that the series of hydrocarbons derived from petroleum were different from those obtained from coal tar, scientific men and oil refiners began to recognize a distinction between benzole and benzine, and by general agreement the latter word was applied to the light oils of petroleum, while benzole was reserved to designate the original oil discovered by Faraday, and now made in enormous quantities from coal tar to be used in the manufacture of aniline colors. Commercial benzine is a mixture of various hydrocarbons, and it is impossible to assign a constant composition or chemical formula to the article sold under this name. The following table will exhibit some of the products derived from petroleum:

Rhigoline,	specific grav.	0·60	(90°B.),	goes over at	100°F.
Gasoline,	"	"	0·63–0·61	(80–90°B.)	"	"	170°
Naphtha,	"	"	0·67–0·63	(70–80°B.)	"	"	280°
Benzine,	"	"	0·73–0·67	(60–70°B.)	"	"	300°
Kerosene,	"	"	0·78–0·72	(50–60°B.)	"	"	400°

Above 400° F., mineral sperm and paraffine oil, with specific gravity 72 to 85, are produced. In the United States the petroleum refiners apply the trade name benzine to the naphtha that comes over at 300° F., and has the specific gravity of 0·73 to 0·67=60 to 70° Baumé. In England the term "benzene" is sometimes applied to the volatile naphtha obtained in the rectification of coal tar, and also to petroleum ether.—Benzine is a colorless, ethereal liquid, volatile at ordinary temperatures, so that its vapor takes fire at a distance, the same as that of ether; its specific gravity is 0·70; it boils at 140° F. (benzole, 176° F.); it has never been frozen (benzole freezes at 37° F.). It increases the illuminating power of gases, but is inferior to benzole in this respect; it burns with a smoky flame. It does not mix with water or methylic alcohol, but does so readily when warmed with absolute alcohol; fatty and essential oils, and bisulphide of carbon. It dissolves fats, wax, and paraffine; india rubber swells up and finally goes into solution; mastic, damar, colophonium, and pitch are with difficulty attacked by it, and amber, copal, and shell lac scarcely at all. If asphaltum or pitch be covered in a test tube with benzole, it is rapidly dissolved into a tarry liquid; whereas benzine is after the lapse of a few hours scarcely colored by the pitch. Fine benzole can in this way be distinguished from benzine.—Benzine is used in the manufacture of varnishes and paints; to remove grease spots; to extract oils and essential principles from seeds and plants; to make water-proof leather; to carbonize illuminating gas in the manufacture of air gas; to preserve anatomical specimens; as a substitute for turpentine in paints; in the manufacture of lampblack; and as a highly explosive and dangerous burning fluid. It has been used to adulterate kerosene, and this abuse of the article has cost hundreds of lives. The wholesale price of benzine in the United States in 1870, according to the report of Dr. Chandler to the board of health of the city of New York, was from 12 to 16 cents a gallon. Benzole cost at the same time about $1 a gallon.—Benzine is not acted upon by nitric acid, and hence cannot be employed in the manufacture of aniline colors. Chlorine, bromine, and iodine also produce no particular compounds with it. On comparison of benzole with benzine, it will thus be found that they differ widely from each other in boiling and freezing point, in molecular composition, in chemical reactions, in solvent properties, in specific gravity, and in their origin and uses.

BENZOIC ACID (H, $C_7H_5O_2$), an acid which is abundant in the balsamiferous plants, and is produced artificially from bitter-almond oil, hippuric acid, and naphthaline. Gum benzoin, the product of the *styrax benzoin* of the Asiatic archipelago, is the principal source of the supply of benzoic acid. Common benzoin occurs in reddish lumps, which sometimes have a lamellated fracture, and certain whitish opaque masses. When recent it emits an odor of bitter almonds. Gum benzoin appears to be composed of a mixture of three varieties of resin, with benzoic acid and a small quantity of a fragrant essential oil. Only one of the resins is soluble in ether; a second is soluble in alcohol only. The white opaque masses appear to consist of the resin which is soluble in ether; they yield less benzoic acid than the brown portions.—Benzoic acid may be extracted from powdered benzoin by boiling it for some hours with milk of lime, filtering the solution of benzoate of lime from the insoluble compound of resin and lime, and, after concentrating the filtrate, adding hydrochloric acid. Benzoic acid is thus precipitated, and may be purified by sublimation. The acid is, however, generally extracted by the less economical but simpler process of direct sublimation from gum benzoin, which contains 14 or 15 per cent. of the acid. If the resin be coarsely powdered and exposed to a tempera-

ture of about 302° F., the acid which exists ready formed in it is expelled, and may be condensed in suitable receivers. Mohr's plan of conducting the sublimation is the simplest and best. His method is to place the gum in a shallow iron pan, which is covered with a sheet of filtering paper, over which a cone or hat of writing paper is fastened; on applying a regulated sand heat, the acid is decomposed, and the benzoic acid is converted into vapors; it passes through the bibulous paper, and rises into the chamber formed by the paper cone, where it is condensed, and is prevented from falling back into the pan beneath by the interposed sheet of filtering paper. This method of sublimation is applicable in many other cases of a similar kind, as for example in the manufacture of pyrogallic acid. The resins of tolu and benzoin, when treated with boiling nitric acid, yield an amorphous form of benzoic acid, colored yellow with a resinous matter which accompanies it into its salts, and hinders them from crystallizing. Balsam of tolu often yields nearly half its weight of this acid. This resinous acid is completely soluble in boiling water. When this form of the acid is exposed to the sun's rays, it becomes covered with white crystals of pure benzoic acid; and when sublimed, the ordinary crystalline acid is obtained. Benzoic acid is now prepared artificially on a large scale from naphthaline and from hippuric acid, and is employed in the treatment of tobacco, as a mordant in calico printing, and especially in the production of aniline colors.—Benzoic acid assumes the form of white, glistening, extremely light, flexible needles, which usually have an agreeable aromatic odor and a hot bitterish taste. The odor, however, is not due to the acid, but to the presence of a trace of essential oil which accompanies the acid during the sublimation. Benzoic acid melts at 248° F. (120° C.); it sublimes at 293° F. (145° C.), and boils at 462° F. (239° C.). Its vapors are acrid and irritating; when kindled in the open air, they burn with a smoky flame. The acid requires about 200 parts of cold water, and 25 of boiling water, for its solution; but it is readily dissolved by alcohol and by ether. Benzoic acid yields a series of salts called benzoates, mostly soluble in water. The benzoate of ammonia is sometimes used as a means of separating iron from nickel and cobalt.—When prepared in the usual way by sublimation, benzoic acid contains a portion of the volatile oil. It is used in a few officinal preparations, especially in camphorated tincture of opium. When given internally, it is excreted by the urine, which it renders acid, in the form of hippuric acid. It has been employed as a local hæmostatic, though without proved utility.

BENZOIN (Malay, *kaminian*), the gum benjamin of commerce, an odorous resin extracted from the *styrax benzoin*, a tree which attains a considerable height, and is the peculiar product of Bencoolen, Batak, and Palembang territories, in Sumatra, and Brunai territory in Borneo. The tree is cultivated and raised from the small brown nut which it produces. When the plant has attained its fourth year and its stem has a diameter of eight inches on the E. coast of Sumatra, and six years and ten inches diameter on the W. coast, it begins to yield its best sap, which flows from the bark, and which is obtained by making an incision therein near the ground. That obtained during the first two years after tapping is of a creamy or light saffron tint, and is soft and fragrant; for two or three years more it produces an inferior quality, of reddish hue, and harder than the best; after this time the sap ceases to flow, the tree is cut down, and a very inferior resin is obtained by scraping the inner surface of the bark and the stem. From the Batak country it is brought to the markets on the W. coast of Sumatra in cakes called *tampang*, of different weights, and these cakes constitute the chief currency of the Bataks, who do not make use of coined money. The benzoin obtained in Palembang territory is mainly collected by wild tribes in the lowest state of civilization, the Kubu in the Rawas and Batang-Lekoh districts, and the Kumsing further south. The Palembang resin is generally of an inferior quality, being mostly spontaneous exudations of wild trees, collected by these wild tribes. The resin is used as an incense in Greek and Roman Catholic churches. It is sometimes employed in medicine, being considered a valuable expectorant and stimulant, and still more in perfumery. The odor of the best resin somewhat resembles that of the vanilla bean. Being soluble in spirits, and not in water, it is erroneously called a gum. Its density varies according to quality, from 1·063 to 1·092. Besides benzoic and cinnamic acid and a small quantity of essential oil, it contains three different kinds of resins, which have not yet been employed in the arts. It is used in several kinds of fine varnishes and lacquer work, on canes and snuff-boxes, which emit a faint vanilla odor when warmed with the hand.—Benzoin is supposed by some writers to be the *malabathrum* of the ancients. Pliny and Dioscorides describe it very accurately; and mention is made in the Periplus of the Erythræan sea of malabathrum, an article of commerce on the Malabar coast, said to be brought from a country further east. Importations into the United States are prohibited unless the drug

Styrax benzoin.

yields 80 per cent. of resin, or 20 per cent. of benzoic acid.

BENZOLE, a peculiar product of coal tar, important in the manufacture of aniline colors. (See BENZINE.) Its chemical formula is $C_{12}H_6$ (old), or C_6H_6 (new). Its synonymes are benzol, benzin, benzene, bicarburetted hydrogen, and hydrite of phenyl (Fr. *phène*). There are numerous methods for the preparation of benzole, but the only one of practical value, invented by Mansfield in 1847, is founded upon the distillation of coal tar. The crude tar, as it comes from the gas works, is first subjected to regulated distillation, so as to obtain separately naphtha or light oil (oily liquid lighter than water); secondly, after all the naphtha has passed, dead oil or heavy oil (oily liquid sinking in water); and thirdly, pitch, which remains behind in the retort. From the light oil the benzole is separated by further fractional distillation. The resulting product, which is far from being absolutely pure, is the well known preparation for removing grease stains from articles of dress. It is also extensively used as a solvent of caoutchouc and resins. When required for the production of aniline, it must be rectified by subjecting it to further operations. The boiling point of pure benzole is 80° C. (176° F.), whereas commercial benzole boils from 80° to 120° C., and is therefore a mixture of several compounds. The transformation of benzole into nitro-benzole is accomplished by dissolving benzole in fuming nitric acid and mixing the clear liquid with water, when the nitro-benzole is precipitated as a dense yellow liquid. Nitro-benzole has for some years been sold under the trade name of *essence de mirbane*, or artificial oil of bitter almonds. Nitro-benzole when submitted to the action of reducing agents is converted into aniline. The successive changes of benzole are thus expressed in chemical symbols:

First change, transformation of benzole into nitro-benzole:

$$\underset{\text{Benzole.}}{C_6H_6} + \underset{\text{Nitric acid.}}{4NO_3} = \underset{\text{Nitro-benzole.}}{C_6H_5NO_2} + \underset{\text{Water.}}{H_2O}.$$

Second change, transformation of nitro-benzole into aniline:

$$\underset{\text{Nitro-benzole.}}{C_6H_5NO_2} + 3H_2S = \underset{\text{Sulphuretted hydrogen.}}{C_6H_7N} + \underset{\text{Water.}}{2H_2O} + \underset{\text{Sulphur.}}{3S}.$$

On the large scale, instead of sulphuretted hydrogen, nascent hydrogen produced from iron turnings and acetic acid is employed as the reducing agent. The inhalation of nitro-benzole produces insensibility to pain, but from some slight irritation it was found to occasion when the experiments were made, it has not come into general use as an anæsthetic.—At ordinary temperatures benzole is a limpid, colorless, strongly refracting oil, of specific gravity 0·85 at 15·5° C. When cooled to +3° C. it solidifies into fern-like tufts or into masses like camphor, which melt at 5·5° C., expanding one eighth of their volume, and freezing again at 0° C. Prof. Hoffmann takes advantage of the freezing of benzole to obtain it pure. For this purpose the impure article is placed in a tin or brass vessel, in which an iron rod, having attached a close-fitting piston perforated with numerous small holes, is made to play. On forcing down the plunger the liquid portions ascend and can be drawn off, and on melting the frozen benzole it will be found to be nearly pure. Cooled to —18° C., benzole becomes so hard and brittle that it can be pulverized in a mortar. It boils at 80° C., and volatilizes undecomposed. The oil has a pleasant ethereal smell, and when breathed produces insensibility attended by convulsions; internally it acts as a violent poison. The density of its vapor is 2·75 (calculated 2·704). It is not soluble in water, although it imparts a color and odor to that liquid. Alcohol, wood spirit, acetone, and ether are good solvents of benzole. It dissolves fats, the fixed and essential oils, camphor, wax, india rubber, gutta percha, resins, asphaltum, sulphur, phosphorus, iodine, and picric acid; gum lac, copal, animé, and gamboge in small quantity; quinine, somewhat readily; strychnine and morphine in small quantity; cinchonine, not at all. It is inflammable, and burns with a bright smoky flame; and when its vapor is added to illuminating gas, it materially contributes to the illuminating power; hence it finds extensive application in carburetting or carbonizing poor gas, and in the manufacture of "air gas." The name *phène* was proposed for it by Laurent in allusion to its high value as an illuminating agent, from *φελνειν*, to emit light. It is now nearly superseded for this purpose by petroleum benzine, on account of the comparatively great expense of benzole. A mixture of one volume of benzole with two volumes of alcohol forms a very good lamp oil; more benzole gives rise to a smoky flame. When benzole is passed through a red-hot tube, it is decomposed into solid carbon and a gaseous hydrocarbon. Under favorable circumstances 100 lbs. of coal will yield 10¾ lbs. tar, 8½ oz. tar naphtha, 3 oz. benzole, 4½ oz. nitro-benzole, and 2½ oz. aniline. Benzole has been found ready formed in the native petroleum of Rangoon, and has been made synthetically by Prof. Schulze by the direct oxidation of carbon by means of permanganate of potash. As benzoic acid, from which benzole was originally distilled by Mitscherlich, has also been made artificially, it is not impossible that a synthetical method for the manufacture of benzole may eventually be discovered.

BEOWULF, Tale of. See ANGLO-SAXONS, LANGUAGE AND LITERATURE OF THE, vol. i., p. 504.

BÉRANGER, Pierre Jean de, a French lyric poet, born in Paris, Aug. 19, 1780, died there, July 16, 1857. His father was bookkeeper to a grocer, and married a milliner, the daughter of a tailor of the name of Champy, who kept a small shop in the rue Montorgueil. Here the future bard came into the world, which fact he commemorated in one of his most sprightly songs, *Le tailleur et la fée.* He sprang thus from the people, and in spite of the particle *de*,

which, owing to his father's prejudice, remained prefixed to his patronymic, he never missed an opportunity of proclaiming his plebeian birth. *Je suis vilain, et très vilain*, is the burden of one of his earliest songs. In 1789 he was sent to a school in the faubourg St. Antoine; and from the roof of the house he witnessed the taking of the Bastile by the people, which made a deep impression upon his mind, as appears from a song, *Le quatorze juillet*, written 40 years later. His father, unable to pay his board at school, sent him, without previous notice, to a sister, a widow without children, who kept a small inn near Péronne, in Picardy. Under the guidance of this worthy woman, Pierre received lessons intended to make him a good man and a thorough republican. His republicanism was also developed by the training to which he was submitted at a school established by M. Ballue de Bellanglise, who had been formerly a member of the legislative assembly, and who was, according to Béranger himself, a sort of republican Fénelon, and a true philanthropist. In this school the boys were formed into a kind of democratic association, and elected officers, such as mayor, councillors, and justices of the peace. They debated political questions; on important occasions speeches were publicly delivered by the young politicians, and more than once they sent up addresses to the convention and to Robespierre. Béranger distinguished himself as a clear and cogent speaker. Patriotism, which, as he says, was the great if not the only passion of his life, was already burning in the heart of the boy, and he feelingly narrates his emotions when he heard of the victories or the reverses of the French armies. When the time came for him to learn a trade, he entered the printing office of Lainez, a bookseller, and was treated with great kindness by him. Béranger did not acquire marked proficiency as a printer, but showed an inclination to poetry, and made at that time some rough attempts at rhyme. Toward the end of 1796 he was called back to Paris by his father, who was then engaged in stockjobbing and financiering speculations, as well as in Bourbon conspiracies, and was known as the "banker of the royalists." Young Béranger became the assistant of his father, and evinced much tact and ability in the business. But in 1798 the firm failed, and the young man found himself in very straitened circumstances. "My poverty," he says, "was not barren of pleasure. I lived in an attic on the boulevard St. Martin, and the most magnificent sight opened before my eyes. I had no money, no hope, no prospect of fortune, it is true; but I was free from all the trouble and disgust connected with the business in which I had been engaged against my taste and feelings. To live alone and make verses at my ease, I considered to be true happiness." Friendship and love contributed to embellish his life; and, as far as his slender means would allow, he heartily joined in popular amusements. Graceful remembrances of that time are to be traced in several of his pieces, such as *Le grenier* and *Mon habit*. This careless life lasted several years, during which he sketched the projects of many great works, and wrote some poems and several comedies, two of which were five-act plays. At the end of 1803 starvation stared him in the face; his watch and other valuables had been pawned long ago; his clothing was in the poorest condition, and none of his friends were well enough off to offer him relief. In this extremity he wrote a letter to Lucien Bonaparte, brother of the first consul, sending him, as specimens of his literary attainments, two poems, *Le rétablissement du culte* and *Le déluge*. It was the only instance of solicitation in a long life of independence. Lucien answered him kindly, invited him to an interview, and when he was compelled to leave France authorized the young poet to receive his pension as a member of the French institute, amounting to nearly $200. The next year, 1805, Béranger was engaged by the painter Landon to write the notices for the *Annales du musée*, an illustrated publication, giving outline engravings of the great paintings in the Louvre gallery. This added for two years $350 to his annual income, and enabled him to help his father and contribute to the comfort of his grandmother, who had been entirely ruined. In 1809, being introduced to Fontanes, the grand master of the imperial university, by his friend Arnault, he was appointed to an office worth about $200, which salary was gradually increased to $400. Béranger's life now began to take a more regular shape, and his talent to flow in its proper channel. He had occasionally written songs, mostly of a gay turn, as they were designed to enliven his joyous meetings with his friends whom he visited at Péronne; but he was not conscious that the writing of songs was his true calling, and would ultimately secure him durable fame. At this time, however, he began to pay more attention to lyrical poetry, and to feel that it might be made to take rank as one of the higher branches of literature. Some of the pieces which he wrote during the following years, being circulated in manuscript, created a sensation—*Le sénateur*, *Le petit homme gris*, *Les gueux*, *Le roi d'Yvetot*, among the number. This success procured for him the acquaintance of Désaugiers, the well known song writer of the time, and a very kind-hearted man. Désaugiers took a decided fancy for his young competitor, and prevailed upon him to become a member of the celebrated club *Le caveau*, which had been reëstablished about 1811. The disasters of 1814 and 1815, and the two invasions of France by European armies, caused a bitter pang to the patriotic heart of Béranger, and contributed to give a new and higher direction to his poetical vein. He became the popular, or rather the truly national bard of France. His shafts were chiefly directed

against the Bourbons, and he was not conspicuous for his opposition to the Napoleonic dynasty. The first volume of Béranger's songs was published in 1815. It contained few political pieces, but its popularity excited suspicion in the administrative department in which Béranger was employed, and a recommendation to stop such publications for the future was addressed to him by his chief. But Béranger was now fairly launched on his new course and paid no attention to this notice. He went on to produce new pieces, which, like their predecessors, were at first extensively circulated by singing. They were published in book form in 1821, Béranger having resigned his office before issuing the volume. The sale was immense, and the songs resounded all over the country. Judicial proceedings directed against the poet only added to his popularity and promoted the diffusion of the volume. Brought before the courts, he was sentenced to three months' imprisonment and a fine of 500 francs. This gave a powerful impetus to his inspiration; new songs issued from the jail, and were repeated from one end of France to the other. Béranger had become a political power. A third volume, which appeared in 1825, though scarcely less bold than the preceding, was treated with more forbearance by the government; but the fourth, published in 1828, was severely dealt with, the author being imprisoned nine months and fined 10,000 francs. This was the most brilliant period of his career. Béranger had secured great influence among the chiefs of the opposition party; his advice was sought for and respected; his known disinterestedness, his freedom of speech, which was always united with the utmost courtesy, his want of personal ambition, his generous disposition, and his marked sympathy for young men, endeared him to all, and peculiarly to the inferior classes. He aided, through his songs, in bringing about the revolution of 1830, and took an active part with his friends Lafitte and Lafayette in placing Louis Philippe upon the throne, but refused all the appointments proffered by the king and his ministers. He desired to live as a philosopher, contented with the little income secured by the sale of his songs, and preserving his personal independence. His fifth volume was published in 1833. Although he acted as if willing to be forgotten, there was no abatement in his popularity during the reign of Louis Philippe; and when the revolution of February, 1848, broke out, the name of Béranger was still among the brightest in the eyes of the people. He was returned by the votes of more than 200,000 electors to the constituent assembly. In acknowledgment of the honor, he took his seat, and then sent in his resignation. His last years were passed in retirement, amid his intimate friends; but the admiration which he inspired drew around him numerous visitors, whom he tried to avoid by living as privately as possible in various villages or provincial towns. On the news of his last illness, the street in which he lived, at Passy, was filled by a multitude of persons anxious to show their sympathy for him. His death threw a veil of sorrow not only over Paris, but over all France; and his funeral was attended by a host of mourners. His songs have been reprinted under every possible form, and millions of copies have been circulated among all classes of Frenchmen. They are familiar even to those who are unable to read. Besides the songs published by Béranger himself, he left 92 songs written from 1834 to 1851, and a memoir of himself, which were published a few months after his death. The autobiography is admirable, and furnishes convincing evidence that in him simplicity, honesty, and goodness of heart were united to genius.—See *Béranger et son temps*, by Jules Janin (Paris, 1866).

BERAR, or Nagpore, one of the Central Provinces of British India, bounded N. by the Nerbudda territory, E. by the presidency of Madras, and S. and W. by the dominions of the Nizam, extending from lat. 17° 48′ to 22° 43′ N., and from lon. 75° 24′ to 82° 48′ E.; area, 76,474, sq. m.; pop. 4,650,000, of whom 4,000,000 are Brahmanical Hindoos, 100,000 Mohammedans, and 550,000 Gondees.[1] It consists mainly of an elevated tract, adjoining the Vindhya and Sautpoora ranges. It is watered by the Wurda, Wynegunga, Khahan, Taptee, and Mahanuddy. The soil of the extensive tract along the left bank of the Wurda is very fertile, and well suited to grain, tobacco, sugar, and especially cotton, of which it sent 233,000 bales to England in 1869. The wheat is considered the best in India.—The ancient country of Berar was one of the five original independent kingdoms of the Deccan. In the 17th century it was part of the Mogul empire, and on the fall of that empire it was overrun by the Mahrattas and divided between the Peishwa and the rajah of Nagpore. The latter prince, having joined with Dowlat Row Sindia against the British in 1803, was forced to cede to them the province of Cuttack, together with Sumbulpoor and Patna, and to the Nizam some provinces on the frontier of Hyderabad. On the extinction of the male line of succession in 1853, the country was seized by the British and placed under the direct control of the governor general until the organization of the Central Provinces in 1861. Chief city, Nagpore.

BÉRARD. I. Joseph Frédéric, a French physician, born in Montpellier, Nov. 8, 1789, died there, April 16, 1828. He was educated at Montpellier, and distinguished himself as a champion of the theories of the medical school of that city against the materialism of the school of Paris. He spent some years at the capital, where he assisted in editing the *Dictionnaire des sciences médicales*, analyzed the experiments of Le Gallois on the vital principle, and opposed the phrenological theories of Gall. Returning to Montpellier, he became professor of therapeutics there, and afterward of hygiene.

He published an *Essai sur les anomalies de la variole et de la varicelle* (1818); a treatise on the *Doctrine médicale de l'école de Montpellier* (1819); with Rouzet, a commentary on the *Maladies chroniques* of Dumas (2 vols., 1823); and *Doctrine des rapports du physique et du moral* (1823), in which he fully exposes his philosophical system and combats the doctrines of Cabanis. **II. Pierre Honoré**, a French surgeon, born at Lichtenberg in 1797, died in 1858. He was elected professor of physiology to the faculty of medicine of Paris in 1831, became dean of that faculty in 1848, and in 1852 was appointed by the president of the republic inspector general of the medical schools, and entered into the new upper council of public instruction. He published a *Cours de physiologie* (4 vols., Paris, 1848–'54), edited the *Nouveaux éléments de physiologie* of Richerand (1832), and wrote an account of the sickness and death of Cuvier. **III. Auguste,** brother of the preceding, a French surgeon, born at Varrains, near Saumur, Aug. 2, 1802, died in Paris, Oct. 15, 1846. He studied at Paris under his brother, became professor of clinical surgery to the faculty of Paris, and was one of the founders of the society of surgery. He wrote *Sur le diagnostic chirurgical* (1836), *Structure du poumon* (1836), and various other treatises, and began with Denonvilliers the elaborate *Compendium de chirurgie pratique*, continued after his death by Denonvilliers and Gosselin.

BERAT, or **Arnaut Beligrad,** a town of Albania, European Turkey, in the eyalet and 88 m. N. W. of the city of Janina, on the river Usumi; pop. about 10,000, of whom two thirds are Greeks and the rest Turks. It is the residence of an archbishop and of a pasha, who is lieutenant governor of central Albania. Mt. Tomor towers above it. The upper town contains the vizier's palace, several Greek churches, and about 250 houses. The lower town is mostly inhabited by Turks, and has numerous mosques and a good bazaar.

BERBER (Berber el-Musherrif or el-Mekheir), a town of Nubia, capital of a district of the same name belonging to Egypt, on the E. bank of the Nile, in lat. 17° 59′ N., lon. 33° 59′ E., 25 m. N. of the mouth of the Atbara, and 190 m. N. of Khartoom; pop. about 8,000. The streets are unpaved and dirty, and the flat-roofed houses are built of sun-dried bricks. The town is subject to sudden and destructive whirlwinds. It usually contains a garrison of about 1,500 men. It carries on considerable traffic with Egypt and the interior of Africa in spices, ivory, leather, tobacco, liquors, and European manufactures.

BERBERA (anc. *Malæ*), a trading place of Africa, on the S. shore of the gulf of Aden, in the territory of the Somauli, and directly S. of Aden. In summer it is a spot of barren sand. In winter a market is held there, and it becomes a commercial city of more than 20,000 inhabitants, dwelling in tents. The market commences about Nov. 1, increases in activity till March, and closes in May. The export is mostly of cattle, sheep, gold dust, hides, coffee, myrrh, benzoin, ostrich feathers, elephants' tusks, and gum arabic, which are sent to Berbera from the interior. Vessels bring to it cotton and silk goods, beads, wire, sugar, rice, copper, iron, and zinc, from Arabia and other parts of Asia. The climate is wholesome, the water good, and the harbor excellent.

BERBERINA, an alkaloid which receives its name from having been found in the *berberis vulgaris* or common barberry, but which has been obtained from many other plants, among which are the columbo root, false columbo (*coscinium*), gold thread (*coptis*), yellow root (*xanthorrhiza*), yellow puccoon (*hydrastis*), and probably the prickly ash (*xanthoxylum*). Some of these vegetables, all of which have yellow root wood, were used by the Indians for dyeing. The alkaloid, having the formula $C_{40}H_{17}NO_8$, occurs in the form of minute yellow crystals, has a bitter taste, and forms difficultly soluble salts with hydrochloric and sulphuric acids, and a readily soluble acetate. The impure muriate is used by the eclectic practitioners under the name of hydrastin, and must not be confounded with the colorless alkaloid hydrastia, also found in the *hydrastis Canadensis*. The effects of berberina are probably those of a pure bitter, though it is less employed in medicine, except in the form of the impure muriate just mentioned, than the drugs, especially columbo, which contain it.

BERBERS, the race which originally peopled the whole northern part of Africa, embracing the nations known to the Greeks and Romans as Mauri, Gætuli, Numidians, Nasamones, Phazanians, and Libyans. The Barbary states derive their name from them. Some writers have derived the name from the Arabian word *bar*, desert; others from *berberat*, murmuring, as descriptive of the sound of the North African language; others from Ber, the son of one of the shepherd kings of Egypt. The Berbers call themselves Amazirghs, either from their progenitor or as a generic name signifying noble or freemen. They have been conquered in succession by the Phœnicians, Romans, Vandals, and Arabs. The Arabs in the 7th century, like the former conquerors, took chiefly possession of the northern portions of their territory, and dispersed them over the interior, between Egypt and the Atlantic. The principal remnants of the race consist of three groups: the Shelloohs, found in Morocco, the Kabyles in Algeria, and the Tuariks in the desert. Their language is classed by modern philologists among the Hamitic tongues. By some it is specifically designated as Libyan. Their number is estimated at between 3,000,000 and 4,000,000. They are light brown in complexion, of middle stature, and sparely but strongly built. They have dark hair, little beard, dark and piercing eyes, and are proud, suspicious, implacable, and generally at war.

BERBICE. **I.** A river of British Guiana, which rises about lat. 3° 30′ N. and lon. 57° 30′ W., and flows generally N. to New Amsterdam, where it falls into the Atlantic through an estuary 3½ m. wide, crossed by a bar having but 7 ft. of water at low tide. The mouth is divided by Crab island into two channels, both pretty deep. The river is navigable by vessels drawing 12 ft. for 165 m., where the influence of the tide ceases, and above which point numerous cataracts impede navigation. Larger vessels can reach Fort Nassau, 45 m. from the sea. At new moon shipping is imperilled by a formidable bore. The river is studded with bowlders and abounds in caymans, and its banks are generally low and covered with luxuriant vegetation. In a basin of this river Schomburgk in 1837 discovered the magnificent water lily, the *Victoria regia*. **II.** The eastern of the two counties into which British Guiana is now divided, bounded E. by Dutch Guiana, and having a coast line on the Atlantic of about 150 m.; area, about 21,000 sq. m.; pop. about 50,000. It is watered by the Berbice and several smaller rivers. The interior is principally inhabited by aborigines, numbering about 30,000. The surface is mostly covered with water during the rainy seasons (April to July, and December and January), and the cultivated portions are narrow strips along the coast and the banks of the rivers for some distance inland. Sugar, coffee, cacao, and cotton are the staple productions; rum and molasses are exported in large quantities; and dye and other valuable woods, spices, and fruits are plentiful. Travelling is chiefly done by boats on the rivers. Berbice was first settled by the Dutch, but was several times seized upon (last in 1803) by the British, to whom it was finally ceded in 1814. It was united with Essequibo and Demerara under one government in 1831. Capital, New Amsterdam.

BERCHTESGADEN. **I.** A principality of S. E. Bavaria, in the circle of Upper Bavaria, between the valleys of the Salzach and the Saalach, surrounded on all sides but the N. W. by the Austrian duchy of Salzburg; area, 155 sq. m.; pop. about 9,500. Only a small portion is fit for cultivation. Cattle are fed on the Alpine meadows, and the rest of the surface is all rock, forest, and mountain, comprising the W. half of the Salzburg Alps, and in it Mount Watzmann, above 9,000 ft. high. The mountain scenery and that of the Königs or Bartholomäus lake rival Switzerland in picturesqueness. The lake is walled on almost all sides by mountains, and on its shores is St. Bartholomä with a chapel for pilgrims and a royal hunting box. Chamois are sometimes driven by peasants into the lake, when they are shot from boats. In this locality is an ice chapel, a drifted heap of snow which remains unmelted even in summer. Enormous fishes have been at times caught in the lake, which chiefly abounds in the char (*salmo Alpinus*). Besides salt, the products are marble, gypsum, lead, and other minerals. The inhabitants are noted for their quaint manners and costumes, and for their skill in manufacturing toys of wood, bone, and ivory, and other handiwork, known as Berchtesgaden ware. The former ecclesiastical territory of Berchtesgaden was secularized in 1803 as a principality of the electorate of Salzburg. In 1805 it came into the possession of the Austrian crown, and in 1810 into that of Bavaria. **II.** A small town in the district of Traunstein, capital of the principality, 12 m. S. of Salzburg, on the Ache or Albe, an affluent of the Königs or Bartholomäus lake, which is 3 m. distant; pop. about 1,800. The former convent, a stately building on a rocky elevation, has become a royal château. The late King Maximilian had a hunting villa built here in 1852. Adjoining the town are the extensive *Sudhäuser* or boiling houses, which produce annually over 150,000 quintals of various kinds of salt. The salt mine is about 1 m. below Berchtesgaden, and the deposit is supposed to be a continuation of the celebrated Hallein mine near Salzburg, though rock salt is here found in larger masses. Owing to the scarcity of wood, most of the brine is conveyed in pipes to Reichenhall, 11 m. distant. The superfluous brine is raised by an ingenious system of pumps over mountains nearly 2,000 ft. high. The total length of the brine conduit or aqueduct from Berchtesgaden and Reichenhall to Traunstein is nearly 60 m. The salt manufacture has been in active operation since the end of the 12th century.

BERCY, formerly a French village, forming since 1860 part of Paris, on the right bank of the Seine; pop. about 14,000. There is a large trade in wine, brandy, oil, and vinegar, conducted by more than 1,000 wholesale dealers; and there are also sugar refineries, lumber yards, and tanneries.

BERDIANSK, a seaport town of Russia, in the government of Taurida, on the N. shore of the sea of Azov, and on the cape of Berdiansk, near the mouth of the river Berda, 150 m. N. E. of Simferopol; pop. in 1867, 12,465. It has the best harbor on the sea of Azov, and carries on a large trade with Kertch. There are several tallow factories and brick kilns, a custom house, and a theatre. Near the town are valuable coal mines and two salt lakes from which large quantities of salt are made. The exports are grain, linseed, rape seed, hemp, butter, tallow, hides, and wool; the imports, coffee, oil, olives, pepper, and fruits. In the vicinity are large colonies of Mennonites. Berdiansk in 1828 was an insignificant village, and owes its development to Prince Vorontzoff. In 1855 the English and French fleets destroyed the Russian vessels in the port and burned the suburbs.

BERDITCHEV (Pol. *Berdyczew*), a city of Russia, in the government and about 85 m. W. S. W. of Kiev; pop. in 1867, 53,787, mostly Polish Jews. It is the centre of trade between southern Russia and Germany. Five annual fairs

are held in the city, the greatest of which are those in June and August. Large herds of horses and horned cattle are brought thither by Russians, Tartars, and Kirghizes, besides furs, silks, fancy stuffs, glass, wood, and iron ware, salt, fish, corn, and beet sugar, by merchants from different parts of the country and from Poland. Berditchev has wide streets with large squares, well built houses, an exchange, many warehouses, 10 tobacco factories, and factories for silk, perfumes, tallow candles, oil, wax, and leather. Many pilgrims are attracted by a miraculous image of the Virgin in the Carmelite convent. In 1765 King Stanislas Augustus of Poland, to which country the town then belonged, established 10 markets in Berditchev, since which time the city has been growing in commercial importance.

BEREG, a county of N. E. Hungary, bounded N. E. by the Carpathians and S. W. by the Theiss; area, 1,439 sq. m.; pop. in 1870, 139,223, over half of whom are Ruthenians, 5,000 Jews, 2,800 Germans, 600 Slovaks, and the rest Magyars. The N. part is mountainous and rather barren, but the county is fertile in fruits, especially in the south, which produces wine little inferior to Tokay. The forests abound with game and cattle, and the numerous streams, all tributaries of the Theiss, with fish and water fowl. Gold is no longer found, but there is abundance of iron ore, porcelain clay, and alum, the last of which is extensively refined. The principal towns are Munkács, and Beregszász, the capital (pop. in 1870, 6,272).

BERENGARIUS (Berenger), an ecclesiastic who played a conspicuous part in the 11th century as an opponent of the doctrine of transubstantiation, supposed to have been born at Tours in 998, and to have died there in 1088. He resided at Tours during the greater part of his life, and held a canonry in the church of St. Martin, though he was at the same time archdeacon of Angers. His opponents, Guitmund and Berthold, describe him as a man of shallow intellect and little erudition, whose chief dialectic weapons were the use of terms in a novel signification, and the employment of opprobrious epithets. It is difficult to discover precisely what was his doctrine of the eucharist, although it is certain that he denied transubstantiation. He commenced his attack on this dogma in 1045, and was supported at first by several bishops, the chief of whom were Bishop Bruno of Angers and Bishop Frollant of Senlis, as well as by a still larger number of the inferior clergy and students. Philip I., king of France, countenanced him for a time, from political reasons. The bishops abandoned him, however, at a later period, and all political countenance was withdrawn from him. The opinion of Berengarius, together with that of John Scotus Erigena, whom he professed to follow, was first condemned by a council at Rome. A public dispute which he held with two monks of Bec, before William of Normandy, ended also unfavorably for him. Soon after (1050) two synods were held, the first at Vercelli, the second at Paris, to both of which he was invited, and where, on his failing to appear, his doctrine was condemned. In 1054 a synod was held at Tours, by the papal legate Hildebrand (afterward Gregory VII.), where Berengarius retracted his doctrine, and signed the formula of faith presented to him, without any attempt to defend himself. As he continued, however, to preach and propagate his doctrine, it was condemned again by Victor II. in 1055; by Nicholas II. and a synod of 113 bishops at Rome in 1059, where Berengarius made a new retraction; by the French synods of Angers, Rouen, St. Maixent, and Poitiers, between 1062 and 1076; by two synods at Rome in 1078 and 1079; and finally by the synod of Bordeaux in 1080. At these last three synods Berengarius renewed his recantation in the most precise language, but after each one, except the last, continued to teach his doctrine as before. After the last recantation he certainly abstained from attacking the doctrine of the Roman church, and he is said to have died in her communion. The remains of his works are to be found in the collections of D'Achéry and Martène, and in a more recent publication by Vischer (Berlin, 1834).

BERENGER I., king of Italy from 888 to 924. His father was Eberhard, duke of Friuli; his mother a daughter of Louis le Débonnaire of France. Upon the deposition of Charles the Fat, Berenger was recognized as king of Italy by one assembly of the states, and Guido, duke of Spoleto, by another. Civil war ensued, but Guido, who had assumed the title of king and emperor, died in 894, and his son Lambert, who also assumed these titles, died in 898. Another competitor for the throne arose in Arnulph, king of Germany; but he died in 899. The nobles then called in Louis, son of Boson, king of Provence, who marched into Italy; but Berenger surrounded him and forced him to take an oath never to reënter Italy. He violated his oath, returned, and was crowned. Berenger surprised him near Verona, took him prisoner, caused him to be blinded, and sent him back to Provence. Berenger was now crowned by Pope John X. as king and emperor, and gained considerable successes over the Saracens and Hungarians, who had invaded his dominions. The nobles, jealous of his growing power, set up another competitor, Rudolph, king of Burgundy, who invaded Italy in 921. A decisive battle took place at Firenzuola, July 29, 923. At the moment when the army of Rudolph was on the point of rout, his brother-in-law brought up large reënforcements; and Berenger, in turn defeated, was forced to take refuge in Verona, where he was assassinated, in March, 924, by a man named Lambert, to whose son he was godfather.—**Berenger II.,** king of Italy from 950 to 961, son of Gisela, daughter of Berenger I., and of Adalbert, marquis of Ivrea. His

stepmother, Ermengarda, had placed upon the throne her brother Hugh, count of Provence, who at length ordered Berenger to be seized and blinded. He escaped, and took refuge in Germany with Otho the Great, and in 943 began to excite the Italians against Hugh, and in 945 entered Italy at the head of an army, upon the invitation of the nobles and bishops. Hugh abdicated in favor of his son Lothaire, who received the title of king, but Berenger exercised the real authority. Lothaire died, it is supposed by poison, in 950, Berenger was now crowned together with his son Adalbert, to whom he wished to marry Adelaide, the widow of Lothaire. She sought the protection of Otho, who in 951 marched into Italy, penetrated without opposition to Pavia, the capital of Berenger, and married Adelaide. The next year Otho returned to Germany, whither he was followed by Berenger, who besought him to restore to him the crown upon any conditions, and whom he finally reestablished as a feudatory of the German empire. But, scarcely on his throne again, Berenger undertook to punish those of his subjects who had taken part with Otho. The German emperor thereupon sent an army under his son Ludolph, who speedily overran nearly all Italy, but died the next year. In 961 Otho himself took the field. Berenger shut himself up in the fortress of St. Leo, where he stood a long siege, but was starved out in 964, and forced to surrender. He and his wife were imprisoned at Bamberg, where he died in 966. His son Adalbert troubled the Germans for a while, but was at last forced to flee and take refuge in Constantinople.

BERENICE, the name of several Egyptian and Syrian queens and princesses. **I.** Daughter of Lagus and Antigone, went to Egypt in the train of Eurydice, second wife of Ptolemy I. (Soter), became herself his third wife, and induced him to make her son, Ptolemy Philadelphus, his successor in preference to an elder son by Eurydice. Her wisdom and virtue were celebrated by Plutarch and Theocritus, and after her death divine honors were decreed to her. **II.** Daughter of Ptolemy II. (Philadelphus), and wife of Antiochus II. (Theos), king of Syria. Antiochus entered into a treaty in 249 B. C., by which he agreed to put away his wife Laodice and marry Berenice; but upon the death of Philadelphus, two years afterward, Antiochus took Laodice back and put Berenice away in turn. Laodice, however, distrusted Antiochus and caused him to be poisoned. Berenice fled to Daphne, where she was murdered together with her son and attendants by Laodice's partisans. **III.** Granddaughter of Berenice I., daughter of Magas, king of Cyrene, and wife of Ptolemy III. (Euergetes) of Egypt. Her father promised her in marriage to Ptolemy Euergetes, and soon afterward died. Her mother, Arsinoë, was strongly opposed to the match, and for the purpose of preventing it offered her in marriage to Demetrius the Delicate, son of Demetrius Poliorcetes. But upon the arrival of Demetrius in Cyrene to receive her, Arsinoë herself fell in love with him, and Berenice, indignant that her mother was preferred by Demetrius, caused him to be murdered in the arms of the queen. She then went to Egypt and married Euergetes, to whom she had been originally betrothed. Upon the return of her husband from an expedition into Syria, in fulfilment of a vow, she offered up her hair to Venus. The hair was said to have been changed into the seven stars of the constellation Leo, known as the Coma or Crinis Berenices. She was put to death by order of her son Ptolemy IV. (Philopator) when he succeeded to the throne. **IV.** Also called Cleopatra, daughter of Ptolemy VIII. (Lathyrus) of Egypt, and wife of Alexander II. (Ptolemy X.). She was placed upon the throne by the Alexandrians after the death of her father (81 B. C.); and Alexander, who had been appointed king by Sulla, agreed to marry her and share the sovereignty. He performed his agreement, but caused her to be assassinated 19 days after their marriage, whereupon, it is said, the Alexandrians rose against him and put him to death. **V.** Daughter of Ptolemy XI. (Auletes) and eldest sister of the celebrated Cleopatra. She was proclaimed queen upon the deposition of her father, 58 B. C., and wishing to marry a prince of royal blood, she sent to Syria for Seleucus Cybiosactes, who pretended to be of the royal race of the Seleucidæ. Finding him to be a man of mean character, she caused him to be strangled a few days afterward. She then married Archelaus of Comana, who claimed to be a son of Mithridates Eupator. Aulus Gabinus, having undertaken to restore Auletes to the throne, defeated her and her husband in three successive battles, 55 B. C., and Archelaus was slain. One of the first acts of Auletes after his restoration was to cause his daughter to be put to death. **VI.** Daughter of Costobarus and Salome, sister of Herod the Great, king of Judea, married her cousin Aristobulus. The latter reproached her with the inferiority of her birth, and her complaints of this to her mother increased the hostility against her husband. After his execution (6 B. C.) she married Theudion, the maternal uncle of Antipater, the eldest son of Herod. After the death of Theudion she went to Rome with her mother and remained till her death. She was the mother of Agrippa I. **VII.** The eldest daughter of Agrippa I., married her uncle Herod, king of Chalcis, and had two sons by him. Upon his death in A. D. 48 she lived with her brother Agrippa for some time, and then married Polemon, king of Cilicia. She left him, and was again living with her brother when Paul pleaded before him at Cæsarea. Titus was captivated by her beauty at the siege of Jerusalem and carried her to Rome. He desired to marry her, but was compelled by the public sentiment at Rome to send her back to Judea,

against her wishes as well as his own. Their parting has been made the subject of a tragedy by Racine.

BERENICE. I. An ancient city of Egypt, on a gulf on the W. side of the Red sea, anciently called Sinus Immundus, in lat. 23° 56′ N., lon. 35° 34′ E., 155 m. E. by S. of Syene (Asswan). The city stood upon a narrow strip of land between the shore and a range of hills. It was probably founded by Ptolemy II., and being the terminus of a great road from Coptos on the Nile, 210 m. distant, became the emporium of commerce between Ethiopia and Egypt on the one hand and Syria and India on the other, and so continued under the Romans. The population was about 10,000. Some ancient remains exist. **II.** An ancient city of Cyrenaica, situated upon the promontory of Pseudopenias, at the mouth of the small stream Lathon, near the E. extremity of the Great Syrtis. It was originally called Hesperis because the garden of the Hesperides was supposed to be in its neighborhood. It acquired importance under the Ptolemies, and was named Berenice from the wife of Ptolemy Euergetes. Many of its inhabitants were Jews. Its prosperity received a blow from the insurrection of the Jews during the reign of Trajan, from which it never recovered. Under Justinian it was fortified and adorned with baths. Benghazi now occupies its site.

BERESFORD, James, an English author, born at Upham, Hampshire, in 1764, died in September, 1840. He was educated at Oxford, and became rector of Kibworth, Leicestershire. He was the author of various independent works and of contributions to the "Looker-on," a periodical published in 1792–'3. His most noted work was "The Miseries of Human Life," a prose satire often reprinted.

BERESFORD, William Carr, viscount, a British general, born in Ireland, Oct. 2, 1768, died in Kent, Jan. 8, 1854. He was the illegitimate son of the first marquis of Waterford, and entered the army at an early age. While in Nova Scotia he lost an eye. He served at Toulon, in Corsica, the West and East Indies, and in Ireland, and took part in the conquest of the Cape of Good Hope. Thence he was detached in 1806 in command of the land forces of an expedition against Buenos Ayres, with the rank of brigadier general. He took the place, but was obliged to surrender it with his corps, and soon afterward made his escape. He was in command of the force which captured Madeira in 1807 and took possession of the island. In 1808 he was sent to Portugal with the rank of major general and intrusted with the organization of the Portuguese army. He was one of the commissioners upon the adjustment of the terms of the convention of Cintra. He accompanied Sir John Moore into Spain, was present at the battle of Corunna, and covered the embarkation of the troops. In 1809 he was appointed marshal and generalissimo of the Portuguese army, which he reorganized and brought into a state of great efficiency. He supported Wellington throughout the peninsular war, and took part in all the principal battles. On May 4, 1811, he invested the fortress of Badajoz, but considered it advisable to raise the siege, and on the 16th defeated Soult at the battle of Albuera, rather, however, through the courage of his soldiers than through his own generalship. He took part in the victories of Salamanca, Vitoria, Bayonne, Orthez, and Toulouse, and was created field marshal of Portugal, duke of Elvas, and marquis of Santo Campo. In 1810 he was chosen member of parliament, but never took his seat. In 1814 he was created Baron Beresford of Albuera and Dungannon, and went on a diplomatic mission to Brazil; and in 1817 he suppressed an insurrection in Brazil, on behalf of the Portuguese government. After his return to England he was made viscount (1823) and general of the army (1825). From 1828 to 1830 he was master general of the ordnance. Having assisted in forwarding English troops to Dom Miguel, he was deprived by the Portuguese government of the rank of field marshal. In politics he was a decided tory. He married in 1832 his cousin Louisa, daughter of the archbishop of Tuam and widow of Thomas Hope, but died without children, his titles becoming extinct.

BERESINA, or **Berezina,** a river of Russia, government of Minsk, rises in lat. 55° 10′ N., lon. 27° 50′ E., and flows S. E. through a level country, and empties into the Dnieper above Retchitza. By the canal which connects it with the Düna the Baltic communicates with the Black sea. The river is memorable for the battle fought upon its banks in November, 1812. The army of Napoleon on its retreat from Moscow, hard pressed by Kutuzoff and Wittgenstein, was about to cross the river by the bridge at Borisov, but found that it was in the possession of the Russians under Tchitchagoff. Napoleon then constructed two bridges at Studienka, a small village N. W. of Borisov. In the afternoon of the 26th the passage was commenced, and continued through the 27th undisturbed by the enemy. On the morning of the 28th the Russians attacked the French in force. The remnants of the corps commanded by Oudinot, Ney, and Davoust fought with desperation, and gradually made their way across, but the Russians succeeded in establishing a battery of 12 guns which commanded the bridge. Very great confusion and loss of life was caused among the French, especially in the unfortunate rear guard commanded by Victor. Many sick and wounded soldiers and stragglers remained upon the left bank, but on the morning of the 29th preparations were made by the French to burn the bridge. After it had been set on fire, those who remained behind rushed upon it and perished in the flames or in the river. It is said that when the ice broke up in the spring 12,000 bodies of the French were found upon the banks. The Russians took about 15,000 prisoners.

BEREZOV. **I.** Also called **Berezovsk,** a village of Russia, in the government of Perm, on the E. slope of the Ural mountains, about 10 m. N. E. of Yekaterinburg, noted for its gold mine, which employs 6,000 men; pop. in 1867, 1,567. **II.** A small town of Siberia, in the government of Tobolsk, on the left bank of the Sosra, a branch of the Obi, in lat. 64° 3′ N., lon. 65° E.; pop. about 1,500. It is the sole station for traffic in furs in a vast extent of territory, and the annual fair held here is well attended. Berezov is noted in Russian history as a place of exile.

BERG, an ancient duchy of Germany, on the lower Rhine. In 1108 Adolph and Ebrard, the two counts of Teisterband, were created by the emperor Henry V. counts of Berg and Altena. One of their descendants divided his territory between his two sons, and made one count of Berg and the other of Altena. It was subsequently connected with Limburg, and still later with Cleves and Jülich. In 1666, after long disputes, Cleves was given to Brandenburg, and Jülich-Berg to the Palatinate. After many new changes Jülich was annexed to France by the wars of the revolution, and Berg to Prussia. In 1806 Berg too was ceded to France. In 1808 it was enlarged and erected into a grand duchy by Napoleon, and given first to Murat and afterward to the eldest son of Louis Napoleon, king of Holland. It was incorporated in 1815 with Prussia under the treaty of Vienna, and is now included in the three districts of Arnsberg, Düsseldorf, and Cologne.

BERG, Friedrich von, count, a Russian general, born May 26, 1790. When a young man he published an account of his travels in southern Europe and Turkey, which led to his being sent by Capo d'Istria, minister of foreign affairs, to Naples in a diplomatic capacity, but for the purpose in reality of observing the carbonari, his accounts of whom attracted much attention. As colonel in the army he took part in expeditions against the Kirghizes (1822–'4), and also in one to the Aral sea (1825), which had important scientific results. In 1830 he married in Italy the countess Cicogna. He served for 12 years under Prince Paskevitch in Poland, and was employed upon diplomatic missions and in military topography. In 1843 he was appointed general of infantry and quartermaster general on the imperial staff, and transferred to St. Petersburg. When Austria in 1849 requested the assistance of Russia against Hungary, Berg was sent as plenipotentiary to Vienna, and used all his influence with Prince Paskevitch to prevent a breach between him and Haynau. On his return to St. Petersburg he engaged in topographical works of magnitude. Having been sent as governor to Finland, he was recalled in 1861 on account of his unpopularity. He was next employed, in 1863–'4, in putting down the insurrection in Poland, at first as adviser of the grand duke Constantine, and afterward as commander-in-chief and governor of that province, an office which he still holds (1873). He was created field marshal in 1867.

BERGAMA, a town of Asiatic Turkey, 50 m. N. of Smyrna, built on the site of ancient Pergamus; pop. about 12,000. The remains of several temples, of a prytaneum, gymnasium, amphitheatre, and other public buildings, bear witness to the magnificence of the ancient city.

BERGAMI, Bartolommeo, courier of Caroline, queen of England, said to have been the son of a village apothecary. Originally a common soldier in the Italian army, he had risen to the rank of quartermaster. In 1814 at Milan he was recommended to Queen Caroline by the marquis of Ghislieri as a man of character and attainments. He was singularly good-looking, and was taken into her service as courier. He nearly lost his life by drinking through mistake a glass of poisoned wine that had been intended for the queen. He accompanied her upon her travels through Germany, Italy, Greece, and Syria, and was treated with great favor, promoted to the position of chamberlain and master of the horse, admitted to the table of her majesty, and presented with a handsome estate near Milan. At Palermo the queen obtained for him the title of baron. His sister the countess of Oldi was made lady in waiting, and one of his brothers steward and the other treasurer. Upon the return of the queen to England proceedings were instituted against her which were founded principally upon the charge that she had been guilty of improper intimacy with Bergami upon her travels. The public sentiment in England, however, was upon the queen's side, and the proceedings were discontinued. After the queen's return to England Bergami continued to reside in Italy in the enjoyment of the wealth received from her.

BERGAMO. **I.** A province of N. Italy, a part of Lombardy, bounded N. by Sondrio, E. by Brescia, S. by Cremona, and W. by Milan and Como; area, 1,027 sq. m.; pop. in 1872, 368,112. It comprises the three districts of Bergamo, Clusone, and Treviglio. The Alps extend down into the northern districts of Bergamo and Clusone, which are well wooded. The southern district, Treviglio, is part of the great Lombard plain, and is rich and fertile. The principal rivers are the Adda, its tributaries the Brembo and Serio, and the Oglio, an affluent of the Po, which flows through Lake Iseo. The vine, the olive, and the walnut are cultivated, and there are large plantations of mulberry trees. The province has valuable iron mines, large iron works, and several woollen and silk factories. It is celebrated for its beautiful scenery. The inhabitants are clownish and awkward in appearance, but shrewd. Their dialect is peculiar. The harlequins of the Italian stage have imitated their manners and accent, and are supposed to have had their origin in the valley of the Brembo. **II.** A city, capital of the province,

between the Serio and Brembo, 28 m. N. E. of Milan; pop. in 1872, 37,363. It consists of an upper and a lower town, half a mile

Bergamo.

distant from each other. The former, called the Città (anc. *Bergomum*), is situated upon a steep and lofty hill, one of the last spurs of the Alps. It was strongly fortified by the Venetians, and its dismantled walls now form beautiful boulevards. The church of Santa Maria Maggiore was begun in 1134, but not completed until long afterward. The northern part, erected in 1360, is of black and white marble. The interior is rich in stucco decorations and paintings, among which are remains of old frescoes, some of which are supposed to belong to the 14th century. The stalls of the choir and screen are among the finest specimens of wood carving in Italy. The campanile, more than 300 ft. high, appears conspicuously in the view. The sacristy, erected in 1430, is among the earliest examples of the introduction of the Roman style in connection with the Gothic. Adjoining the church is the sepulchral chapel of Bartolommeo Colleoni, a famous condottiere of the 15th century; the façade, which has lately been restored, is very fine, ornamented with different-colored marbles. The duomo, or cathedral, has a fine cupola, which forms a conspicuous object. Before the Palazzo Vecchio, or Broletto, which contains a public library of 70,000 volumes, stands the statue of Torquato Tasso, whose father was a native of the town. In the Carrara academy lectures are given on art. There is also an academy of music, in which Donizetti was taught, a theatre, and other public buildings. The lower town, called the Borgo or suburb of San Leonardo, is the seat of business. It is noted for La Fiera di Sant' Alessandro, a large square building of stone, within which are streets, 600 shops, and an open space in the centre adorned with a fountain. A great annual fair commences here in August, which is said to have been held ever since the 10th century. The building was erected in 1740. The commodities sold are silks, cloths, wools, iron, &c.

BERGAMOT, a kind of green-colored citron or small orange, of fine flavor and taste, of round form, the fruit of the *citrus margarita* (*bergamia* of Risso and De Candolle). The rind furnishes by distillation an essence or oil which is much used in perfumery, and to some extent in medicine. The bergamot tree is a native of the south of Europe, and is particularly abundant in the neighborhood of Nice. To obtain 2½ ounces of oil, 100 bergamots are consumed. This oil or essence has a very agreeable, sweetish odor, and a bitter, aromatic taste. Its specific gravity is 0·885. In composition it is not to be distinguished from oil

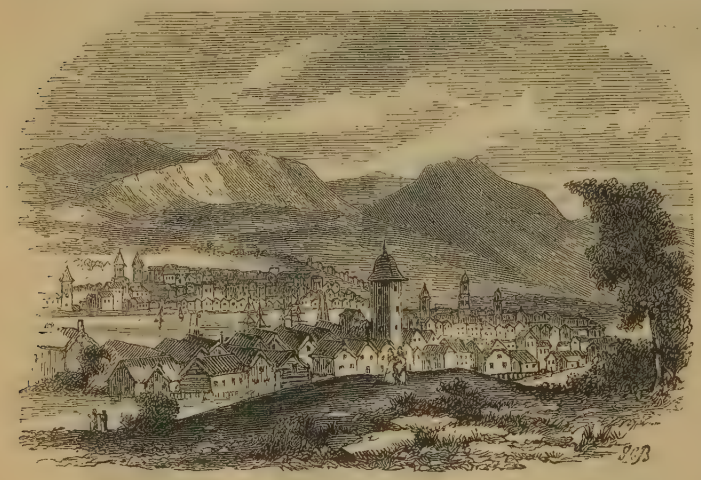
Bergamot (Citrus margarita).

of lemons. Alcohol is used to adulterate it, and is not readily detected when added only to the extent of 8 per cent.—Bergamot is also the name of a variety of pears, which, like the citron tree of the same name, is said to have originated in Bergamo, Italy.—The word is also used to designate a coarse tapestry, supposed to have been invented at Bergamo.

BERGEN, a N. E. county of New Jersey, bordering on New York and bounded E. by the Hudson river; area, 350 sq. m.; pop. in 1870, 30,122. On the W. bank of the Hudson, with-

in the limits of this county, are the Palisades, a range of trap rock which rises perpendicularly from the river to a height of 500 ft. The county is intersected by Ramapo, Hackensack, and Saddle rivers, has an uneven and in the western part mountainous surface, and a productive soil. It contains limestone and magnetic iron ore. It is intersected by the Erie railway, the Hackensack branch, and the Northern railway of New Jersey. The chief productions in 1870 were 8,788 bushels of wheat, 31,719 of rye, 146,140 of Indian corn, 45,533 of oats, 24,009 of buckwheat, 209,162 of potatoes, 18,208 tons of hay, and 323,919 lbs. of butter. There were 3,535 horses, 4,076 milch cows, 1,861 other cattle, 473 sheep, and 2,953 swine. Value of produce of market gardens, $240,462. Capital, Hackensack.

BERGEN. **I.** A province (*stift* or diocese) of Norway, comprising most of the W. part of the country, including the mainland and many



Bergen, Norway.

inhabited and desert islands along the coast, bounded N. by Trondhjem, E. by Hamar and Christiania, S. by Christiansand, and W. by the ocean; area, 14,869 sq. m.; pop. in 1865, 267,354, exclusive of the city of Bergen, which has a separate administrative organization. It consists of the districts (*amts*) of Söndre and Nordre (south and north) Bergenhuus and of part of the district of Romsdal. Among the largest gulfs is the Hardanger or Bommelfjord, 83 m. long. The principal river, the Leerdals, rises in the Fille mountains and joins a branch of the Sognef gulf. There is good pasturage between the high mountains which extend over nearly the whole province and around the gulfs; and cattle breeding and fisheries, chiefly of herrings, are the principal industries. Agriculture has been lately somewhat improved, though corn must still be imported in a few parishes. Marble is found to some extent. Copper and iron ore, though abundant, are not much worked owing to their rather inaccessible situation and to the scarcity of wood. Rain is singularly frequent, and the inhabitants suffer much from diseases of the skin. **II.** A city and seaport, capital of the province, in the bailiwick of Söndre Bergenhuus, on the W. coast, 180 m. W. N. W. of Christiania; pop. in 1865, 29,194. An island called Askö, opposite the town and 3 m. distant, encloses a bay called Byefjorden, which divides into two branches called Vaagen and Pudefjorden. The town is built upon the promontory between these two parts of the bay, and extends in a semicircle around the Vaagen. Behind the town on the land side are high mountains. It was formerly the first commercial city of Norway, and is now the second in importance. The harbor is excellent, but difficult of access. It is defended by the castle of Bergenhuus and six smaller forts. The Nordlandmen come to the city twice a year with fish, skin, and feathers. In March and April 600 or 700 vessels may be seen in the harbor at one time. About $2,000,000 worth of fish are exported annually. The city was founded in 1070 by King Olaf Kyrre, who built the castle and some of the churches. It was several times devastated by the black plague. The first foreign treaty made by the English was made in this city in 1217. The merchants of the Hanseatic league afterward obtained a foothold here, and in 1445 established a Hanseatic trading factory. Their clerks and agents were subject exclusively to the government of the Hanse towns. Marriage was not permitted to them. In September, 1455, they caused to be put to death Governor Olaf Nielsen, Bishop Torlief, and 60 other persons. Finally Frederick II. of Denmark on July 25, 1560, issued a decree, called the "Odense Recess," for the determination of disputes between the citizens and the subjects of the league, which broke up its supremacy. Merchants from other countries began to share in the business, and in 1763 the last house belonging to the Hansa became the property of a citizen of Bergen.

BERGEN-OP-ZOOM, or **Berg-op-Zoom,** a fortified town of the Netherlands, in the province of North Brabant, on the river Zoom, near its entrance into the East Scheldt, 19 m. N. N. W. of Antwerp; lat. 51° 29′ N., lon. 4° 17′ E.; pop. in 1867, 9,431. It is well built, has a good harbor, a handsome town house, an ancient palace

now used for barracks, two arsenals, several powder magazines, and a number of earthenware and other manufactories of small importance. It has a considerable trade in sardines. The place was one of the strongholds of the Netherlands in their struggle with the Spaniards, and was repeatedly besieged by the latter without success. The fortifications are protected by a morass, and after the Spanish wars were much strengthened by the engineer Coehorn. They were taken however by the French in 1747 under Count Löwendal. The town having been restored to the Dutch upon the declaration of peace, it again surrendered to the French under Pichegru in 1795. The English besieged it in 1814 without success.

BERGENROTH, Gustav, a German-English historian, born in Prussia in 1813, died in Madrid in February, 1869. He was assessor to the high court of Berlin from 1843 to 1848, when he joined the extreme liberals. After the revolution of 1848 he went to the United States, wrote an account of a vigilance committee to which he belonged in California in 1850, and after several voyages across the Atlantic settled in England in 1856, with the object of collecting from the record office materials for the history of the Tudors. The master of the rolls commissioned him to report on the important discoveries in the archives of Simancas, and he pursued his task amid great difficulties at Simancas and in London, Brussels, and Madrid. He edited several volumes in the "Calendar of the State Papers" (London, 1870–'71), under the direction of the master of the rolls, and was still prosecuting his researches when he died. He also wrote an essay on Wat Tyler, the story of Queen Joanna for the supplementary volume of the "Calendar of Spanish Papers," and the abstract of D'Avila's account of the murder of Don Carlos by Philip II. Mr. W. C. Cartwright published in 1870 a "Memorial Sketch of Bergenroth."

BERGERAC, a town of France, in the department of Dordogne, on the right bank of the river Dordogne, 25 m. S. S. W. of Périgueux; pop. in 1866, 12,116. It is ill built, but finely situated, and divided into two parts, one of which is called St. Martin de Bergerac and the other Madeleine. The town grew out of the abbey of St. Martin, founded in 1080. It was taken by the English in 1345, who were not finally dispossessed till 1450. It was a stronghold of the Calvinists, and suffered much during the religious wars. Its fortifications were demolished by Richelieu in 1621; and the revocation of the edict of Nantes (1685) destroyed its prosperity. There are iron founderies and smelting furnaces in the vicinity and the town has a trade in Périgord truffles, and in wine, brandy, and liqueurs. The Bergerac red and white wine, often called *petit champagne*, is produced on the Dordogne and Gironde, the best being the Montbazillac, St. Nexans, and Sancé.

BERGERAC, Savinien Cyrano de, a French author and duellist, born at Bergerac in 1620, died in Paris in 1655. He was compelled by serious wounds to retire from the military service, in which he had distinguished himself by his reckless courage, and took up his residence in Paris, where he became a notorious duellist. He was never at a loss for quarrels. When the sight of his long nose, which was covered with scars, provoked a smile, a duel was the result. He ordered the actor Montfleury not to play for a month, and he was compelled to obey him. Bergerac's pen was no less formidable a weapon than his sword. He had controversies with Loret, Scarron, Montfleury, and others. He studied philosophy under Gassendi, mastered the principles of Descartes, and gave some attention to the philosophers of antiquity. His best works are *Le pédant joué*, a comedy written when he was at college, and *Agrippine*, a tragedy. Corneille and Molière found in his writings suggestions for some of their happiest efforts; and Swift is supposed by some critics to have been indebted to his *Histoire comique des états et empires de la lune* and *Histoire comique du soleil* for incidents of his "Gulliver's Travels." The works of Bergerac were published at Paris in 1677 and 1741.

BERGHAUS, Heinrich, a German geographer, born at Cleves, May 3, 1797. In 1815 he served as a volunteer in the German army under Gen. Tauenzien in France, and made use of his observations during the campaign in the preparation of his map of France (1824), the best up to that time. From 1816 to 1821 he was employed upon the trigonometrical survey of Prussia under the war department. He also aided in the preparation of Weiland's map of the Netherlands and Reymann's map of Germany. In 1824 he was appointed professor of applied mathematics in the Berlin academy of architecture, and held that office till 1855. Besides contributing to various periodicals, he has published a map of Asia in 18 sheets; a physical atlas, the basis of that published by A. Keith Johnston; and a collection of hydrographical maps for the Prussian navy. He edited the *Hertha* (1825–'9) and several other geographical periodicals; and his works include *Allegemeine Länder- und Völkerkunde* (6 vols., Stuttgart, 1837–'41); *Die Völker des Erdballs* (2 vols., 2d ed., Brussels and Leipsic, 1852); *Grundlinien der physikalischen Erdbeschreibung* (2d ed., Stuttgart, 1856); *Grundlinien der Ethnographie* (2d ed., 1856); and a translation of Catlin's works on the North American Indians (1848).

BERGHEM, Nikolaas, a Dutch painter, born in Haarlem in 1624, died Feb. 18, 1683. He was the son of the painter Peter Klaas van Haarlem, and studied under his father, Van Goyen, Weenix, and others. It is said that one day when pursued by his father into Van Goyen's studio, Van Goyen exclaimed to the other pupils *Berg hem*, "Hide him;" and thus he received his name. His paintings were early in great demand. He was extremely industrious, and his works, most of which are

landscapes with groups of figures and cattle, are careful in finish, effective in composition, and harmonious in coloring. The atmospheric effects are admirable. There are 11 of his pictures in the Louvre, 18 in the museum of the Hermitage at St. Petersburg, and others in England, at Amsterdam, Vienna, and elsewhere. He left a great number of pictures and a number of exquisite drawings and etchings. His works bring high prices.

BERGMAN, Torbern Olof, a Swedish chemist and naturalist, born at Katarinaberg, in West Gothland, in March, 1735, died at Medevi, July 8, 1784. Intended by his father for the law or the church, he was sent to the university of Upsal, where he injured his health by excessive study, and applied himself by way of recreation to botany and entomology. He sent to Linnæus several insects previously unknown in Sweden, and devised a new method for their classification founded upon the characteristics of the larvæ. His first paper, published in the memoirs of the academy of Stockholm in 1756, narrated the discovery that leeches are oviparous, and that the substance called *coccus aquaticus* is the ovum of a species of leech containing several of the young animals. Linnæus wrote upon the memoir as he gave it his sanction, *Vidi, et obstupui.* Bergman devoted himself from this time to almost every branch of science. He presented memoirs to the academy upon attraction, electricity, twilight, the rainbow, and the aurora borealis; became in 1761 adjunct professor of physics and mathematics at Upsal, and was appointed in the same year one of the astronomers to observe the first transit of the planet Venus over the sun. In 1758 an association of savants was formed for the purpose of advancing knowledge of the earth; to each of the members a particular portion of the subject was assigned, and Bergman received the department of physics. The report which he made after eight years of study was rapidly sold and translated into foreign languages. In 1766 he was appointed to the chemical chair of the university, and immediately silenced the murmurs of his opponents by publishing a curious and original memoir on the manufacture of alum. From this time he devoted himself wholly to the study of chemistry, and determined to banish from chemical science all preconceptions, and to proceed only by observation of facts. He published in 1774 a paper "On the Aërial Acid," subsequently called carbonic acid, and proved that it was a new and distinct acid. By boiling nitric acid with sugar, gum, and other vegetable substances, he produced oxalic acid. He succeeded in analyzing mineral waters, and formed factitious mineral waters by combinations of their elements. In his researches on this topic he adopted the opinion that caloric is a fluid, and was the first discoverer of sulphuretted hydrogen, which he called the hepatic gas. He was the first to employ the humid method in the examination of minerals, and by combining it with the dry method he obtained a knowledge of the principal elements of the emerald, topaz, sapphire, and other precious stones. He was the first also to derive important results in chemistry from the use of the blowpipe. All of his labors led him to a chemical classification of the minerals, according to which the genera were determined by the principal integrant elements, the species by the different degrees in which they were combined, and the varieties by the external form. Applying geometry to the forms of crystals, he laid the foundation for the theory of crystallization afterward developed by Haüy. He demonstrated that the superiority of certain kinds of steel was due to the presence of manganese, and that the brittleness of steel in extreme cold was caused by siderite, a substance which he thought a new metal, although it has since been recognized as the phosphuret of iron. The theory of affinities, proposed by Geoffroy in 1718, had been the first step toward giving a philosophical foundation to the science of chemistry. Bergman, seizing upon this idea, made it almost his own by an immense number of new experiments, and presented chemical phenomena as only modifications of the great law which rules the universe. To the curious operations of the elements when placed in juxtaposition—two united elements being separated by the approach of a third with which one of them combines, and two compounds as they meet each other interexchanging some of their elements and thus forming two new compounds—to these elementary movements he assigned the name elective, and introduced the term elective affinities. His mathematical training is seen in the simple formulas by which he described chemical operations. He adopted the erroneous though ingenious ideas of Scheele concerning phlogiston, and in general his discoveries of facts were of much more value than his theoretical explanations. His labors distinguished him throughout Europe; he corresponded with the principal contemporary chemists and physical philosophers, was a member of numerous learned societies, and received from the king of Sweden the order of Vasa. He remained at Upsal, though invited to Berlin by Frederick the Great, till the state of his health, broken by his immense labors, obliged him to repair to the mineral springs where he died. His "Physical and Chemical Essays" were translated into English by Dr. Edmund Cullen (2 vols., 1788; 3d vol., 1791).

BERGONZI, the name of a family of Italian stringed instrument makers. **I. Carlo,** born and died at Cremona. He was a pupil of Stradivarius, and was actively employed in the construction of violins, violas, and violoncellos from 1716 to 1755. He often imitated his master's style, especially in the purfling and the form of the sound hole. He had also the secret of the varnish which lent so much beauty to the violins of that maker. He was chiefly renowned

for the excellence of his violoncellos. His instruments are quite rare and very valuable, as he ranked probably third in merit among the Cremona makers, that is, next after Guarnerius, Stradivarius holding undoubtedly the first position. **II. Michel Angelo,** son of the preceding, was also a violin maker, but greatly inferior to his father in workmanship and finish, as also in varnish. His instruments bear date from 1750 to 1780. **III. Nicolò,** son of Michael Angelo, born in 1758, died in 1838. The earliest of his known instruments, a viola, is dated 1780. He formed the connecting link between the days of Stradivarius and our own, remembering and pointing out the house where the great violin maker lived.

BERGUES, or **Bergues-St.-Winoc,** a fortified town of France, department of Nord, 5 m. S. S. E. of Dunkirk, on the railway from that place to Hazebrouck, and at the junction of several canals, by one of which vessels of 300 tons reach the town from the sea; pop. in 1866, 5,738. It is well built. The finest buildings are the town house, an ancient clock tower 160 feet high, and the two towers of the abbey of St. Winoc. It has manufactories of soap, hosiery, cotton yarn, sugar, salt, distilled spirits, leather, &c., and has a considerable trade in corn, cheese, butter, wine, and cattle. It was fortified by Vauban, and besieged by the English in 1793 without success.

BERINGTON, Joseph, an English author, born in Shropshire in 1744, died at Buckland in Berkshire, Dec. 1, 1827. He belonged to a Roman Catholic family, was educated at St. Omer, and after 20 years' ministry as a priest in France was placed in charge of a chapel at Buckland near Oxford. He wrote a number of controversial works; a valuable "History of the Lives of Abelard and Heloisa" (London, 1784); "Account of the Present State of Roman Catholics in Great Britain" (1787); "History of the Reign of Henry II. and of Richard and John," especially with reference to the life of Thomas à Becket (Birmingham, 1790); "Memoirs of Gregorio Panzani, giving an Account of his Agency in England in 1634–'5–'6" (London, 1793), a translation from the Italian, which gave great offence to the Catholics; "Examination of Events termed Miraculous" (1796), in which he disputed the authenticity of certain accounts of wonderful events in Italy; "The Faith of Catholics," with Dr. Kirk (1813); and a "Literary History of the Middle Ages" (1814).

BÉRIOT, Charles Auguste de, a Belgian violinist and composer, born in Louvain, Feb. 20, 1802, died in Brussels April 10, 1870. At the age of nine he was able to perform difficult concertos for the violin. In 1821 he became a pupil in the Paris conservatoire, but soon found that his style was already too absolutely formed to admit of much modification. He commenced giving concerts, and made himself famous in England, France, Austria, and other European countries, being distinguished for the purity of his tone, his correctness of intonation, and his refined taste. Some of his concert tours were made in company with Mme. Malibran, whom he married in 1835. She died within six months, and De Bériot was not again heard in public for several years. In 1842 he was appointed professor of the violin at the conservatoire of Brussels, which position he resigned in 1852 in consequence of almost total blindness occasioned by paralysis of the optic nerve. Among his pupils were Vieuxtemps, Ghys, Prume, and Konsky. He was succeeded in the professorship by Léonard, also one of his best pupils. De Bériot's compositions are numerous, and have been in constant use by violinists. His most valuable production is a very complete manual in three parts entitled *Méthode de violon.*

BERKELEY, a N. E. county of West Virginia, separated on the N. E. from Maryland by the Potomac, bounded S. E. by a branch of that river, and N. W. by the Shenandoah mountains; area, 250 sq. m.; pop. in 1870, 14,900, of whom 1,672 were colored. Its surface is uneven and broken, and its soil stubborn and underlaid with limestone and slate, through which permeate numerous sulphur and chalybeate springs. The Baltimore and Ohio railroad passes through it. The chief productions in 1870 were 296,975 bushels of wheat, 297,639 of Indian corn, 107,588 of oats, 8,529 tons of hay, 239,493 lbs. of butter, and 41,147 of wool. There were 3,358 horses, 3,050 milch cows, 4,015 other cattle, 9,213 sheep, and 8,892 swine. Capital, Martinsburg.

BERKELEY, a market town and parish of Gloucestershire, England, on the right bank of the Little Avon, 1½ m. from the Severn, 3 m. from the Bristol and Birmingham railway, and 15 m. S. W. of Gloucester; pop. of the parish in 1871, 5,523. The Gloucester and Berkeley ship canal extends from Sharpness Point near Berkeley to Gloucester. The town is situated upon a gentle eminence in what is known as the vale of Berkeley, long famous for its butter and cheese, the cheese called double Gloucester being made only here. At the S. E. end of the town stands Berkeley castle, built before the time of Henry II., and still inhabited by a descendant of its founders, Earl Fitzhardinge. In one of its dungeons Edward II. was murdered in 1327. The gate house, hall, chapel, tower, and keep are all in perfect preservation.

BERKELEY, George, an Irish prelate and philosopher, born at Kilcrin, county Kilkenny, March 12, 1684, died in Oxford, Jan. 14, 1753. His father, William Berkeley, came of a family noted for its loyalty to Charles I., and was collector of Belfast. The son received his early education at Kilkenny school, and at Trinity college, Dublin, of which he became a fellow in 1707. About the same time he published a mathematical tract which attracted some notice, and this was followed in 1709 by "An Essay toward a new Theory of Vision." In this he maintained that the eye has no natural

perception of space, and that all its perceptions of distance, size, and position are derived from the sense of touch. This theory has been very generally adopted, although questioned by Sir David Brewster. Berkeley himself vindicated it in a pamphlet 24 years afterward, but this tract is not included in his published works. In 1710 appeared his "Treatise concerning the Principles of Human Knowledge," and in 1713 his "Dialogues between Hylas and Philonous." In these famous works Berkeley denies the existence of matter, and argues that it is not without the mind, but within it, and that that which is generally called matter is only an impression produced by divine power on the mind, by means of invariable rules styled the laws of nature. His professed object in maintaining this theory was to defend revealed religion from the attacks of skeptics, and he always insisted that his views, if accepted, would place Christianity on an impregnable basis. Some writers, however, insist that they contain the strongest arguments against revelation. Beattie's opinion is that they have a skeptical tendency, and Hume expresses himself even more plainly, regarding them as the best weapons of skepticism to be found in any author, ancient or modern. His writings brought him to the notice of the distinguished men of his time, and being intimate with Swift, he formed the acquaintance of Pope, Arbuthnot, Prior, and others. In 1713 he accompanied the earl of Peterborough to Italy, as chaplain and secretary of legation. He returned next year to England, but soon again set out with a Mr. Ashe, and on this tour paid his celebrated visit to Malebranche, the French philosopher, who became so excited in a discussion with Berkeley on the recent theory of the non-existence of matter, that, being ill at the time, he died a few days afterward. Berkeley remained four years abroad with his pupil; he devoted much time to Sicily, and collected materials for an account of its natural history, which were lost at sea. On his return to England he was cordially received in learned circles, but was entirely dependent on his fellowship in Trinity college, until Mrs. Vanhomrigh (Swift's Vanessa) bequeathed him £4,000. In 1724 he was made dean of Derry, the value of the living being £1,100 per annum. But worldly wealth had little value in Berkeley's estimation; and having formed the plan of establishing a college at the Bermudas, for the purpose of training pastors for the colonial churches and missionaries to the Indians, he took a letter from Swift to Lord Carteret, who after long delays promised the aid of the government. It was in anticipation of the happy results of his scheme that Berkeley wrote his well known stanzas "On the Prospect of Planting Arts and Learning in America," in which occurs the oft quoted verse:

> Westward the course of empire takes its way;
> The four first acts already past,
> A fifth shall close the drama with the day;
> Time's noblest offspring is the last.

In August, 1728, he married the daughter of the Right Hon. John Forster, speaker of the Irish house of commons, and in the next month set sail for Rhode Island, where he arrived, in Newport harbor, after a tedious passage of five months, Jan. 23, 1729. Soon after his arrival he bought a farm about three miles from Newport, and erected a house which is still standing; and many interesting reminiscences exist of his sojourn in the island. Not far from his house, and adjacent to the sea, lie the hanging rocks (so called), where at their most elevated point Berkeley found a natural alcove, roofed and open to the south, commanding a wide expanse of the ocean, and in it, tradition relates, he meditated and composed his "Alciphron, or the Minute Philosopher," a defence of religion in the form of a dialogue. But the scheme for the college failed, the government aid promised by Carteret was never granted, and, after a residence in Newport of 2½ years, Berkeley returned to England, giving to Yale college a library of 880 volumes, as well as his estate in Rhode Island, called Whitehall. In 1734 he received, as a special mark of favor from Queen Caroline, the bishopric of Cloyne. This place he held for nearly 20 years, dividing his time between the duties of his diocese, which he fulfilled in the most exemplary manner, and his literary labors. In the latter years of his life he became rather subject to hypochondria, and in hopes of benefiting himself had recourse to tar water, which he was constantly drinking and recommending to his friends, even writing two treatises on its virtues. His works written at this period are "The Analyst," directed principally against Halley and the other mathematical skeptics; "Queries proposed for the Good of Ireland;" a letter to the Roman Catholics during the rebellion of 1745; another to the Catholic clergy entitled "A Word to the Wise;" "Siris, a Chain of Philosophical Reflections and Inquiries concerning the Virtues of Tar Water," and "Further Thoughts on Tar Water." In 1751, feeling himself infirm, and desiring to be near his son, who was about to enter Christ Church, Oxford, he wished to resign his bishopric, which the king would not permit, but gave him leave to reside where he pleased. He removed to Oxford in July, 1752. Pope ascribed to him "every virtue under heaven"; and Atterbury wrote of him: "So much understanding, knowledge, innocence, and humility, I should have thought confined to angels, had I never seen this gentleman." A collection of his works, with an account of his life and many of his letters, was published by Prior (2 vols. 4to, 1784), and there is an edition by the Rev. G. N. Wright (2 vols. 8vo, 1843). A new edition by A. C. Fraser was published in 1871 (4 vols. 8vo, London).

BERKELEY, George Charles Grantley Fitz-Hardinge, an English sportsman and author, born Feb. 10, 1800. He is a son of the late earl of Berkeley, and younger brother of the present *de jure* earl, who does not assume the title.

He was a liberal member of parliament for West Gloucestershire for nearly 20 years. His novel "Berkeley Castle" (1836) being severely reviewed in "Fraser's Magazine," he assaulted Mr. Fraser, the publisher, for which he was prosecuted and compelled to pay £100 damages and costs, and wounded in a duel Dr. Maginn, the writer of the article. He has written many books on sporting in England, France, and the United States. Among his best known publications is "The Upper Ten Thousand at Home and Abroad;" and his more recent works include "My Life and Recollections" (1864), and "Tales of Life and Death" (2 vols., 1869).—His brother, Sir MAURICE FREDERICK FITZ-HARDINGE, born Nov. 16, 1826, was a naval commander, reaching the rank of admiral of the blue, and represented Gloucester in parliament for many years. In 1861 he was raised to the peerage as Baron Fitz-Hardinge, and died Oct. 17, 1867.

BERKELEY, Sir **William,** royal governor of Virginia, born near London, died at Twickenham, July 13, 1677. He was educated at Oxford, and went to Virginia as governor in 1641. During the civil war he sided with the king, and the colony long remained loyal to him; but in 1651 a squadron was detached from the fleet sent to Barbadoes, and upon its arrival in Virginia it compelled Berkeley and his friends to submit to the protector. Richard Bennet was made governor in Berkeley's place, but the latter continued to reside in Virginia unmolested. In 1660, after Richard Cromwell's resignation, Berkeley was elected governor by the Virginia assembly, and received a commission for the office from Charles II. Subsequently he rendered himself very unpopular by his failure to protect the settlers from Indian raids, and a rebellion broke out under Nathaniel Bacon, against which the governor was for a long time powerless. After the death of Bacon Berkeley treated the rebels with extreme severity, and a royal commission sent out to investigate the affair and restore order disapproved of his conduct. He was recalled in 1677, and is said to have died of chagrin. He published "The Lost Lady," a drama (1639), and "A Discourse and View of Virginia" (1663).

BERKELEY SPRINGS, or **Bath,** a town and the capital of Morgan county, West Virginia, about 3 m. from the Potomac river and the Baltimore and Ohio railroad, 77 m. N. W. of Washington, D. C.; pop. in 1870, 407. The place is much visited by invalids, the water of the springs being deemed efficacious in cases of neuralgia, dyspepsia, and chronic rheumatism; its temperature is 74° F.

BERKLEY, Jan Lefrancq van, a Dutch naturalist and poet, born Jan. 23, 1729, died in Leyden in March, 1812. He was the author of various works upon the natural sciences, of which the best was the "Natural History of Holland" (Amsterdam, 1769), and was appointed professor of natural history in the university of Leyden in 1773. As a member of the Orange party he was afterward subjected to great persecution, and in his old age was reduced to poverty, and obliged to sell his fine scientific collections and to depend upon his relations. He published several volumes of poetry.

BERKS, a S. E. county of Pennsylvania, intersected by Schuylkill river, and drained by Tulpehocken, Maiden, Manatawny, and Little Swatara creeks; area, 920 sq. m.; pop. in 1870, 106,701. On its N. W. boundary is the Kittatinny range or Blue mountains; another chain, called here South mountain, but known in Virginia as the Blue Ridge, traverses the S. E. central part; and between these two ranges lies the extensive and fertile Kittatinny valley, comprising the greater part of the county. The soil here is of limestone formation, and is carefully cultivated. There are rich iron mines, in which copper is found in small quantities. The Schuylkill and Union canals, the Philadelphia and Reading, the Reading and Columbia, the Lebanon Valley, the East Pennsylvania, and several branch railroads, pass through the county. Berks was settled by Germans in 1734, and German is still commonly spoken. The chief productions in 1870 were 930,653 bushels of wheat, 281,867 of rye, 1,267,194 of Indian corn, 1,425,157 of oats, 400,846 of potatoes, 114,651 tons of hay, and 2,658,031 lbs. of butter. There were 16,783 horses, 32,112 milch cows, 19,215 other cattle, 56,110 sheep, and 37,553 swine. Capital, Reading.

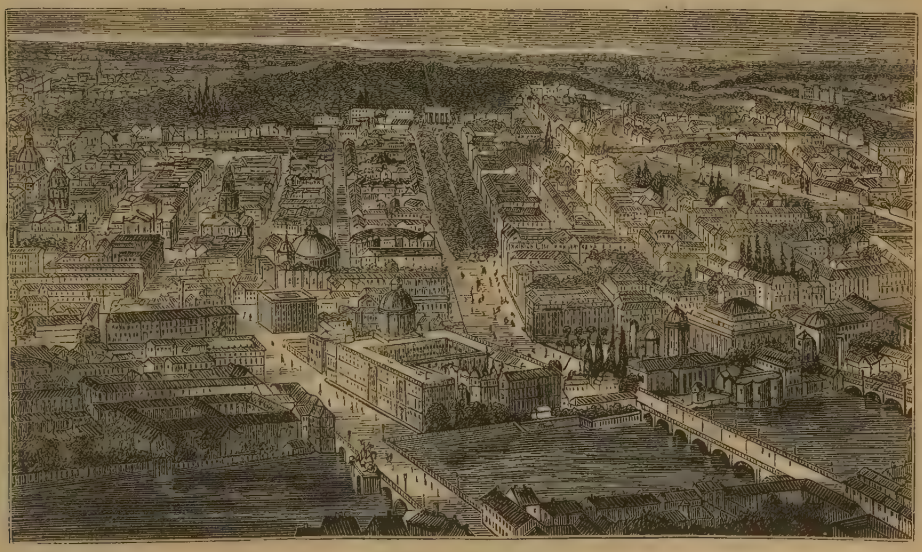
BERKSHIRE, a county of Massachusetts, forming the W. extremity of the state, extending across it from Vermont on the N. to Connecticut on the S., and bounded W. by New York; area, about 1,000 sq. m.; pop. in 1870, 64,827. It embraces a great variety of picturesque scenery. The surface is diversified by mountains, hills, valleys, and rolling land. In the N. part is Saddle mountain, the highest point in the state, and in the N. W. is the Hoosac tunnel, through the mountain of the same name. The soil is fertile, and well watered by the Housatonic, Deerfield, Farmington, Hoosac, and several smaller rivers. Most of the land is devoted to grazing. Marble, iron, and limestone are the principal minerals. The Boston and Albany, the Massachusetts and Vermont, the Troy and Boston, the Housatonic, and the Pittsfield and North Adams railroads traverse the county. Manufacturing is extensively carried on. There are 16 cotton mills, 2 calico print works, 41 paper mills, 27 flour mills, 16 tanneries, 10 planing and turning mills, 154 saw mills, and a great number of other manufactories. The chief productions in 1870 were 2,828 bushels of wheat, 35,903 of rye, 156,384 of Indian corn, 248,642 of oats, 15,667 of barley, 31,901 of buckwheat, 355,670 of potatoes, 84,790 tons of hay, 1,114,343 lbs. of cheese, 1,038,751 of butter, 134,892 of maple sugar, 119,574 of wool, and 22,810 of tobacco. There were 5,028 horses, 15,834 milch cows, 14,153 other cattle, 27,195 sheep, and 4,274 swine. Capital, Pittsfield.

BERKSHIRE, or **Berks,** a county of England, in the midland district, lying in the basin of the Thames; area, 705 sq. m.; pop. in 1871, 196,445. It is well watered by the Thames, the Kennet, the Loddon, the Ock, and the Auburn, with other smaller streams and rivulets. The surface is undulating and well wooded. The climate is one of the healthiest in England. The soil is chalk and stiff clay, with a fine rich loam in the valleys. Berkshire is essentially an agricultural county, and the owners of the model farms established under the auspices of Prince Albert, as well as those of the numerous large estates, have introduced many improvements. Moreover, the farms are mostly large; drainage is general; artificial manures are employed extensively, as well as improved ploughs and drills, and steam threshing machines. Some of the best corn-producing lands in England are in this county, especially in the vale of the White Horse, watered by the Ock. The total area under cultivation in 1867 included 144,443 acres in corn, 55,412 in green crops, 40,312 in clover and grasses under rotation, and 108,377 in permanent pasture. The cattle numbered at the same period nearly 30,000, the sheep over 340,000, and the pigs, the best breed in England, 50,000. The main line of the Great Western and a branch of the Southwestern railway pass through Berkshire, as well as the navigable Wilts and Berks and Kennet and Avon canals. The county is not affected by the reform act of 1867, and continues to return three members to parliament; but its four boroughs, Reading (the shire town), Abingdon, Wallingford, and Windsor, return since 1869 only five instead of six members as formerly.—The traces of ancient roads and other antiquities perpetuate the memory of the Roman period, and there are various remains of Roman or British camps. Many barrows are found, including one N. of Lambourn to which a Danish or British origin is variously assigned, though it is popularly known as Wayland Smith's cave, owing to a tradition, introduced by Sir Walter Scott in "Kenilworth," of an invisible smith having once plied his trade here, this tradition being identified by some authorities with that of the mythical Norse hero Weland or Völunde. The White Horse is a monument of Saxon or Danish, or possibly of Celtic origin, representing a horse cut in the turf, the figure being over 370 feet long. It has given the name to the hill on which it stands, and to the vale. The peasantry periodically clear away the turf, which they call "scouring the horse;" and on this occasion a rural festival takes place, and they are entertained by the lord of the manor. On the summit of the same hill is an ancient earthwork, known as Uffington castle; and the principal Berkshire antiquities in this vicinity include Hardwell camp, Alfred's castle, Dragon Hill, and the Seven Barrows. Berkshire was devastated in the wars with the Danes early in the 11th century, and again became a battleground in the following century during the civil war consequent upon the usurpation of Stephen. Of the famous ancient castles only Windsor castle remains, and small fragments of those of Wallingford and Donnington. In the 17th century Berkshire became the scene of remarkable contests between the royal and parliamentary forces, especially at the first battle of Newbury, in which Falkland fell (Sept. 20, 1643).

BERLICHINGEN, Götz or **Gottfried von,** one of the last of the feudal knights of Germany, born at Jaxthausen, in Würtemberg, in 1480, died July 23, 1562. He was educated under the charge of his uncle Konrad, a knight of the old feudal type, under whose guidance he attained remarkable skill in all warlike exercises. His first military experience was gained in the service of the elector Frederick of Brandenburg; but on the breaking out of the war of succession between Rupert of the Palatinate and Albert of Bavaria, he espoused the cause of the latter, and distinguished himself by reckless bravery in the campaigns which followed. At the siege of Landshut he lost his right hand. It was replaced by one of iron, still shown in the castle where he was born; and thus he acquired the name of Götz with the Iron Hand. After the war he spent much of his time in feuds with his neighbors and petty conflicts, often capturing and plundering merchants, but accompanying his exploits with many exhibitions of chivalrous generosity. In 1519 he assisted Duke Ulrich of Würtemberg against his Swabian enemies, and defended Möckmühl against an overwhelming force, surrendering on condition of his being allowed to withdraw without molestation. This agreement was treacherously broken, and the knight was kept for three years and a half a captive at Heilbronn, only obtaining his release by the payment of a large ransom. In the peasants' war he took a prominent part as a leader of the people, whose excesses, however, he controlled. At the close of this he was again treacherously captured and obliged to swear that he would appear when summoned before the leaders of the Swabian confederation. He kept his oath, and was sentenced by them, after a two years' imprisonment, to give bonds and an oath that he would keep the following conditions: he must take up his residence in the castle of Hornberg, and promise not to spend a single night away from it; even in the day he must not pass certain designated boundaries; he must not mount a horse; he must not himself take revenge on any one of those now sentencing him, nor must he employ any of his friends to do so. If he violated these conditions, he must pay 25,000 florins. He must also pay an indemnity for the damage he had done the cities of Mentz and Würzburg. Von Berlichingen kept this agreement for 11 years, and was at last released from it after the breaking up of the Swabian confederacy. In 1541 he fought under Charles V. against the Turks, at the head of a band of picked men. In 1544 he took part in the campaign against

Francis I., and penetrated into France as far as Château-Thierry. After the declaration of peace he retired again to his castle, Hornberg, and there lived quietly until his death. He was buried in the cloister of Schönthal, where his monument is still shown. He wrote the history of his own life, which was first published at Nuremberg in 1731, and gives an admirable description of the life of his time. Goethe made him the subject of the first of his dramas.

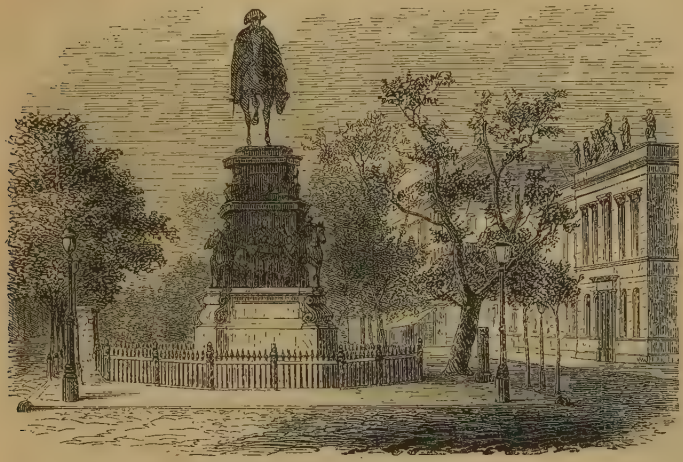
BERLIN, the capital of Prussia and of the German empire, in the province of Brandenburg, in lat. 52° 30′ N., lon. 13° 24′ E., on the Spree, an affluent of the Elbe, 330 m. N. N. W. of Vienna; pop. in 1871, 825,389; in 1867, 702,437, of whom 42,420 were Roman Catholics and 27,607 Jews. In the latter year there were 33,963 buildings, of which 700 were public. The city stands on a dreary plain of sand, on a deep and still growing deposit of infusoria, 130 feet above the level of the sea. The walls, now partly torn down, are about 12 m. in circuit and pierced with numerous gates, of which the Brandenburg gate is the most celebrated, its architecture being modelled after that of the Propylæa in the acropolis of Athens. The city comprises the two former towns of Berlin and Kölln, and was in 1872 divided into 16 precincts, viz.: Old Berlin, Old and New Kölln (on an island of the Spree), Luisenstadt (on the left bank), Friedrichsstadt, Friedrichswerder, Dorotheenstadt, Friedrich-Wilhelmstadt, Spandauer Revier and Stralauer Viertel, Königsstadt, and the suburbs of Wedding (Oranienburger Vorstadt), Moabit (Voigtland), Aeussere Friedrichsstadt, Aeusseres Spandauer Revier, Schöneberger Revier, and Tempelhofer



General View of Berlin.

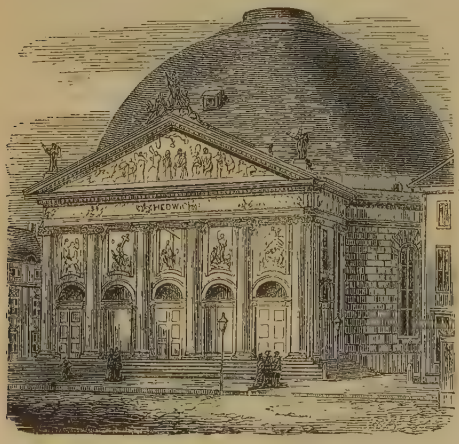
Revier. The villas S. W. of Charlottenburg near the château of Grunewald, partly built and partly in course of construction, are called the West-end; and Charlottenburg promises to become part of Berlin, the city being constantly extended westward, while its central part is intended to be in future for Berlin what the City is for the British metropolis.—With the exception of the most ancient districts, Berlin is remarkable for the general beauty of its streets and buildings. The excessive regularity and capaciousness of many streets, and the multiplicity of palatial buildings and institutions, produce a grand though rather monotonous impression. Unter den Linden, however, is a lively, imposing, and elegant thoroughfare, full of palaces and fine mansions, inferior to the boulevards of Paris in brilliancy, but superior to the Regent street of London in stateliness and in the fine appearance of the trees from which the street derives its name. This is the fashionable city promenade. The Friedrichsstrasse is the longest, the Leipziger Strasse the most animated; the Königsstrasse, in the centre of the city, the most crowded business street; the Wilhelmsstrasse contains many palaces and public buildings; the Luisenstrasse has numerous elegant mansions; and in the Oranienburger Strasse resided Alexander von Humboldt. Prominent among the newer streets are those stretching from the Potsdam gate to the Thiergarten. The aggregate length of all the streets of Berlin is over 160 m. The largest square is the Gensdarmenmarkt in the Friedrichsstadt, with the principal theatre and two churches. Other fine squares are the Lustgarten and the Schlossplatz, divided by the royal palace; the Wilhelms, Opernhaus, Dönhofs, Alexander, and Pariser squares (the last named at the

Potsdam gate), and the Belle-Alliance platz at the Halle gate, with the Friedensdenkmal or Peace monument. There are over 40 bridges, of which the most remarkable



Statue of Frederick the Great, Unter den Linden.

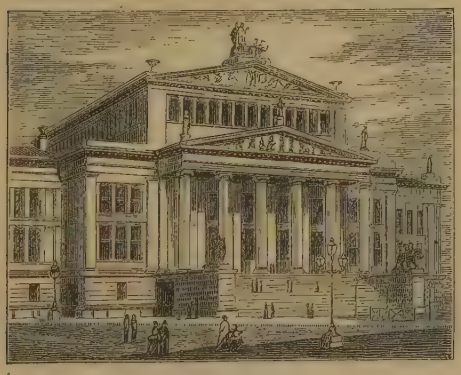
are the Schloss, Kurfürsten, Friedrichs, Marschalls, and Königs bridges. There are over 60 places of worship. The oldest is the Nikolaikirche, dating from the beginning, and the Marienkirche and Klosterkirche, from the close of the 13th century; the last named was restored in 1844. The most recent are the Petri (1846–'54), Markus (1848–'55), Andreas (1854–'6), Bartholomäus (1854–'8), and the new Dorotheenstädtische (1861–'3) churches. The most celebrated for their architecture are the Roman Catholic Hedwigskirche, in the rear of



Hedwigskirche.

the opera house, opened in 1773, and built after the Pantheon in Rome; the Werder'sche Kirche, a Gothic building, designed by Schinkel (1824–'30); and the Roman Catholic Michaeliskirche, near Bethanien. This last, built in 1856 after a design by Soller, in the Romanesque style, is the finest in Berlin. Other renowned religious buildings are the temple of the Jewish reformers in the Johannesstrasse, built in 1855 after designs by Stüler, and the new synagogue in the Oranienburger Strasse, erected by Knoblauch in the oriental style. The old royal palace contains 600 halls and apartments, including a picture gallery and a famous chapel. The cupolas were completed in 1854. Two bronze groups representing "The Horse Tamers" adorn the chief entrance. The palace now occupied by the emperor and empress is nearly opposite the university. The palace of the crown prince was restored in 1857. The royal palace of Bellevue, with fine modern German paintings, is about one mile beyond the Brandenburg gate. The Königswache, in the form of a Roman *castrum*, built by Schinkel in 1818, the new observatory, the military schools, the ministries of war and of commerce, and especially the arsenal with vast collections of trophies of war and arms, are all conspicuous edifices. The new town hall was completed in 1871. The most celebrated public building designed by Schinkel is the old museum, opposite the Lustgarten, built on thousands of piles, on a spot once covered by a branch of the Spree. Under the porticos, the principal of which is formed by 18 Ionic columns, are statues of Rauch, Schinkel, Winckelmann, and Schadow. At the right side of the staircase is the famous bronze group by Kiss representing the fight of an Amazon with a tiger; on the left that of a horseman with a lion, by A. Wolff. On the walls of the colonnade are frescoes from the designs of Schinkel, executed under the direction of Cornelius. On the ground floor is the *antiquarium*, with antique vases, bronzes, gems, coins, and mediæval relics. On the first floor is the sculpture gallery, with the "Boy Praying" among its finest antiques, and Canova's "Hebe" among the best modern works. The picture gallery on the upper floor, though inferior to the collections in Dresden and Munich, contains many fine paintings. This gallery is divided into 37 compartments. Among its most renowned pictures are those by Correggio of "Leda and the Swan" and "Io and the Cloud;" Titian's portrait of his daughter Lavinia; Murillo's "St. Anthony of Padua em-

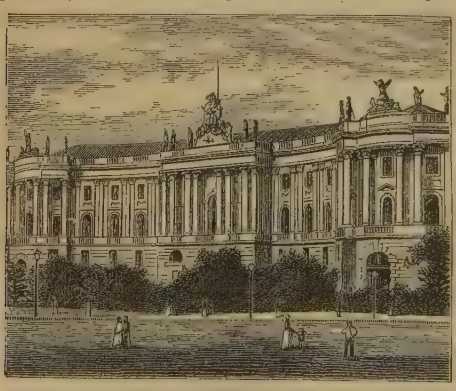
bracing the Infant Christ;" and Nicolas Poussin's "Landscape, with the Story of Juno and Argus." In the rear of the old museum, and connected with it by an arched passage, is the new museum designed by Stüler, with gorgeous internal decorations. On the ground floor are the northern, and on the right side of the great staircase the Egyptian antiquities. The former include an extensive ethnological collection, with relics of almost all civilized and barbarous nations; and the latter, comprising the Egyptological collection of Lepsius, is arranged in its inner court after the model of an Egyptian temple, the entrance, with 16 large colored pillars, being an imitation of the temple of Karnak, and the chamber of tombs of part of the necropolis of Memphis. The extent of this Egyptological collection is as remarkable as its admirable arrangement. In the centre of the new building is a lofty hall decorated with paintings by pupils of Kaulbach after that artist's designs. On the first floor are casts of statuary from the earliest Greek masters down to Thorwaldsen. Half of the upper floor is occupied by the cabinet of drawings and engravings, including the original outline for the cathedral of Cologne; and the other half is used for the chamber of art (*Kunstkammer*), with historical and other art collections, chronologically arranged. It is especially rich in national relics, and also contains works by Albert Dürer, an ivory crucifix ascribed to Michel Angelo, and many fine old ivories, enamelled reliquaries, and curious minerals. The royal theatre (*Königliches Schauspielhaus*), for the



The Royal Theatre.

performance of German and French plays, situated between two churches on the Gendarmes square, has the stage on the second floor and a concert room accommodating over 1,200 persons; it was built by Schinkel in 1819, and is decorated with mythological statuary by Rauch and Tieck. The subscription balls which take place here in winter are great events for the fashionable world. The Italian opera house, rebuilt since 1845 after the destruction of the old building by fire, holds about 2,000 persons, and is a splendid structure near the Linden. The Wallner theatre is popular among the educated classes for burlesque and farces; and the Friedrich-Wilhelmstädtisches theatre, for low comedy, has less select audiences. The architectural academy (*Bauschule*), south of the Schlossbrücke, is one of the most striking and original masterworks of Schinkel, and contains some of that artist's paintings and statuary. The academy of fine arts, in the Linden, is the seat of the new national gallery of paintings and of annual exhibitions of modern paintings. Count Raczynski's gallery, on the Exercierplatz, outside the Brandenburg gate, contains many fine modern German paintings; and in the Ravené cabinet, in the Neue Grünstrasse, is an excellent small collection of both French and German modern works. The academy of music is famous for annual concerts given in the Grecian wing of the building, and especially for the performance of sacred vocal music.—The Thiergarten, extending from the Brandenburg gate almost to Charlottenburg, is a fine park with delightful pleasure grounds, and a celebrated place of recreation. Among the other most popular resorts are Kroll's gardens. Similar establishments are the Odeon, the Hofjäger, the Moritzhof, and Albrechtshof, S. of the Potsdam gate. N. E. of the city is the new Friedrichshain. All these and many other establishments are famous for their music and sociability. The less prosperous classes frequent the Hasenheide on the south and Moabit on the west of Berlin. On the one hundredth anniversary of Alexander von Humboldt's birth, Sept. 14, 1869, the corner stone of a monument to his memory was laid in a new park in the suburbs of the city, to be called "Humboldt Grove." On the left of the New Park, outside the King's gate, is one of the most beautiful cemeteries. Among the others are the old Dorotheenstadt, with the graves of Fichte and Hegel; the old Dreifaltigkeits-Kirchhof, with that of Mendelssohn-Bartholdy; the new Dreifaltigkeits-Kirchhof, with those of Schleiermacher, Neander, Ludwick Tieck, and Varnhagen von Ense; and the Invaliden-Kirchhof, where Scharnhorst and other military men are buried. Berlin abounds with monuments in honor of Prussian kings and soldiers. The most celebrated of them is the equestrian bronze statue of Frederick the Great, by Rauch, on a granite pedestal 25 feet high, erected in 1851 in the Linden opposite the university. The Friedensdenkmal, by Rauch, is near the Halle gate; and the Volksdenkmal or People's monument is beyond that gate on the Kreuzberg, so called from a Gothic cross of cast iron on its summit, which is almost the only eminence near the city. The national monument in honor of those who fell in 1848–'9, in the Invalidenpark, was unveiled in 1854, and the Schiller monument in 1871.—Numerous scientific, artistic, literary, and educational institutions attest the intellectual activity of Berlin. The renowned universi-

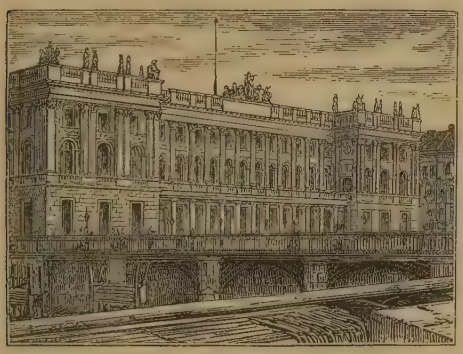
ty, in the Linden, associated with the most distinguished philosophers, divines, scholars, and savants of Germany, holds a commanding influence. The number of professors and teachers in 1870 was 175. The attendance of students was 3,714 during the winter term of 1869–'70, and 3,316 during the summer term of 1870. It contains museums of natural history and of anatomy, remarkable zoölogical and mineralogical collections, and a library of nearly 180,000 volumes. The botanical garden of the university is outside of the city, and includes extensive conservatories and palm houses. The zoölogical gardens, resembling those of Regent's park, London, contain a fine menagerie, and the new aquarium is the largest and most celebrated in continental Europe. In 1870 there were 10 gymnasia, 54 *Realschulen* or high schools, 99 middle and elementary schools, 35 schools under the direction of societies, churches, and corporations, 11 schools attended by both boys and girls, and 2 Hebrew schools; altogether 115 public and 96 private institutions, besides 13 private *Kindergärten* and 19 established on the principle of association, and employing 59 female teachers. Besides the *Gewerbschule*, or school for trades, there are institutions established by the city for higher culture (*Fortbildungsanstalten*). There are 10 libraries for the people, with an aggregate of 60,000 volumes, and many turners' associations, which chiefly promote physical and incidentally also mental development. Among the Jews of Berlin, 56 out of 100 boys and 66 out of 100 girls receive a superior education; while among the Christian denominations the proportion is respectively 20 and 16 per cent. The Jews of Berlin are among the richest and most cultivated of Germany, and many of them stand high in finance, commerce, politics, literature, and journalism. The royal



The Royal Library.

library contains about 700,000 volumes, besides over 15,000 MSS.; and there are extensive collections of books in the academy of sciences and in almost all the other institutions. The annual number of books published is about 1,500, or over one third of the total publications of Prussia; and the number of journals in 1871 was 175.—The principal savings bank has a capital of 2,560,000 thalers and 75,000 depositors. There are 31 industrial mutual aid associations after the system of Schulze-Delitzsch, and the number of mechanics' and manufacturers' unions is nearly 100, with about 80,000 members, and with annual contributions of over 300,000 thalers, about 15 per cent. by the employers, and the rest by the men. Berlin is rich in associations which contribute not only to the material but also to the mental and moral improvement of the laboring classes. But over 100,000 of the poorer people are crowded together in about 15,000 houses, and over 60,000 live in cellars. Houses five stories and more in height have increased since 1864 in the proportion of 43 per cent., the four-story houses 11 per cent., the two and three-story houses 4½ per cent., and the one-story houses 8 per cent. Half of the total number of houses contain only one room which can be heated, and nearly 2,300 houses cannot be warmed at all. This state of things is creating much discontent among the working classes. The increase of illegitimate children amounted to nearly 15 per cent. of the annual births. In 1872 the proportion of unmarried men over 23 was 3,702 in 10,000, and of unmarried women over 16, 3,542 in 10,000. Legislative measures have been lately proposed for improving the police, there being at present only about 1,100 policemen, and at night only watchmen, who have too much private service to do to attend to the security of the streets. The number of arrests in 1869 was over 27,000, including 4,000 dissolute women and 1,500 drunkards; 7,000 of them remained in jail, and 20,000 were discharged. About 4,000 thefts were committed in that year, or nearly 11 daily. The records of the morgue for 1869 included 209 men, 67 women, and 104 children (16 stillborn). About 2,000,000 thalers are annually disbursed in charity, one half of it by public institutions, and the rest by private agencies. Over 8,000 adults and 4,000 children received alms to the extent of 400,000 thalers in 1870, and the capital invested in the municipal institutions for charitable purposes amounts to 1,500,000 thalers. In 1870, 44,000 thalers were spent by the city in affording relief to 43,000 indigent patients in their homes, and 168,000 thalers to 14,000 in the hospitals. Nearly 400,000 thalers are spent for the cultivation of potatoes for the poor, for soup houses, and for other benevolent purposes; 130,000 thalers for orphans, deaf-mutes, and the blind, &c.; and 73,000 thalers for the workhouse, which accommodates 2,500 delinquents and 1,500 vagrants. The medical officers employed in the municipal sanitary institutions include 700 physicians, 60 surgeons, 58 dentists, 75 veterinary doctors, 50 druggists, and 200 midwives. Besides a trades union for sick mechanics, there are nine sanitary unions, affording relief in consideration of small fees by the members,

and four similar institutions chiefly for soldiers. Vaccination is obligatory; hydrophobia and cattle diseases are guarded against by public enactments; and measures are in progress for the establishment of canals and for protection against malaria arising from the defective drainage. Prostitution prevails extensively, over 15,000 females being partly under medical control and under surveillance of the *Sittenpolizei* (administration relating to public morality).—More than half of the population are engaged in various manufactures, including iron and steel ware, machines, and many other articles. Of printed cotton goods the annual production is valued at nearly 9,000,000 thalers. The export of manufactured articles to the United States alone amounts to 4,000,000 thalers. The *Seehandlung* is one of the most celebrated commercial establishments. The commerce in wool and corn is very extensive, and there are over 8,000 commercial houses, including many joint stock companies. The exchange of Berlin, a fine building near the post office on the Königsstrasse, is one of the



The Exchange.

most important financial centres of the continent. Its transactions in 1869 were estimated at 58,000,000 thalers for railways, 5,000,000 for industrial enterprises, 13,000,000 for banking enterprise, and 2,000,000 for loans. The total value of real estate and personal property in Berlin is estimated at 700,000,000 thalers. The city consumes annually 200,000 quintals of butter, 120,000 of coffee, 40,000 of rice, and 4,000,000 tons of coal. In 1869 nearly 200,000 quintals of wool and over 400,000 head of cattle arrived from the interior. There are over 50 breweries, and the consumption of beer is increasing. Nearly 18,000,000 letters annually reach the post office, about one half of them city letters. Over 30,000 persons arrive and depart from Berlin daily, chiefly belonging to the interior of Prussia. Over 3,000 conveyances, including 19 horse cars and 180 stages, circulated in the city in 1870; nearly 50 railway trains arrive and depart daily, and there is a large traffic carried on by the roads and canals.—The population, reduced by the thirty years' war to 6,000, rose by the influx of French refugees under the great elector to 20,000; in 1740 it was 90,000, and it was doubled about the end of the century. In 1831 it was over 200,000; in 1841, over 300,000; in 1851, over 400,000; in 1861, over 500,000; in 1867, over 700,000; and in 1872 it is over 800,000.—According to recent investigations, the original fishing village of Kölln, the primitive site of part of the present city, was surrounded by a heath for geese which was called *Berlin;* and hence this name was afterward applied to the whole city, especially as it was necessary to distinguish it from Cologne (Köln). Under the margrave Albert II. (1206–'20) the villages of Kölln and Berlin, as they were then called, rose from their insignificance. The elector Frederick II. (with the Iron Teeth) built in 1442 a castle at Kölln, on the Spree; and John Cicero chose it as his permanent residence. The rise of Berlin after the calamities of the thirty years' war was mainly due to Frederick William, the great elector, who also built fortifications. Frederick, the first king of Prussia, built the palace and the arsenal, and the enlargement of the city under his reign was carried on by his successors. Under Frederick the Great Berlin rose to intellectual and commercial prominence, and was enriched with additional palaces. During the seven years' war Berlin was occupied by the Austrians and Russians, and subjected to great vicissitudes. Frederick William III. did more than any of his dynasty for the embellishment and improvement of the city, especially after the trials of Berlin during the war with Napoleon I., when Schinkel gave a new splendor to its architecture, while the literary and scientific prestige of the capital was increased by the influence of the university and that of a host of scholars and savants of the highest rank. Frederick William IV. paid much attention to churches, while under his reign the city was enlarged by new suburbs; and the cultivation of new territories and improvements and extensions are going on steadily in almost all directions. The triumphal entry of the German army after the Franco-German war took place here on June 16, 1871; and the emperors of Russia and of Austria were in Berlin on a visit to the emperor of Germany in September, 1872.—See Streckfuss, *Berlin seit* 500 *Jahren* (1864), and *Berlin und seine Entwickelung* (an annual publication of the statistical bureau).

BERLINGHIERI, Andrea Vacca, an Italian surgeon, born in Pisa in 1772, died there, Sept. 6, 1826. He studied anatomy at Paris, under Desault, and in England, under Hunter and Bell, and on his return to Pisa published some observations on Bell's system of surgery. In 1799 he was appointed to assist his father, who was professor of surgery in the university of Pisa, and three years later was placed at the head of the school of clinical surgery, which was then founded. He invented useful instru-

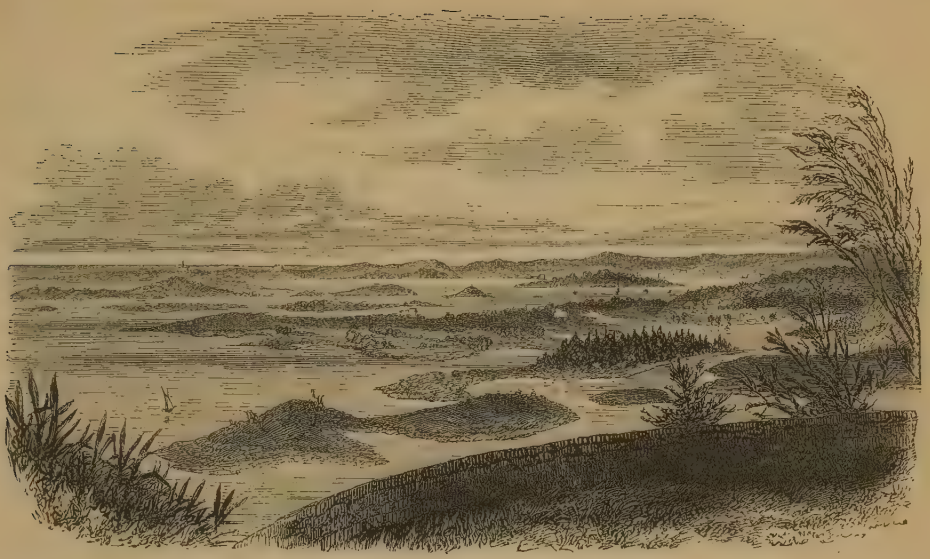
ments for performing the operations of cystotomy and œsophagotomy, and for the treatment of trichiasis, the lachrymal fistula, and the fracture of the femur bone. He made improvements in many other surgical instruments and processes, and was the author of numerous treatises on professional topics.

BERLIOZ, Hector, a French composer, born at Côte Saint Andre, in the department of Isère, Dec. 11, 1803, died in Paris, March 8, 1869. His father, a physician, sent him in early life to study medicine; but his love of music soon led him to abandon that profession and to enter the *conservatoire de musique*. His father now cast him off, and he supported himself as a chorus singer at the *gymnase dramatique*, and studied composition. In 1830, with his cantata *Sardanapale*, he took the first prize at the conservatoire, entitling him to pursue his studies in Italy for 18 months at the public expense. Returning to Paris, he produced rapidly a number of orchestral works intended to illustrate his proposition that every musical composition should be the expression of some definite thought and have a distinctly marked object. To this kind of composition the name of programme music was given. Berlioz found enemies to his system on every hand, and defended himself against their attacks through the *Journal des Débats*, by which he was for many years employed as musical critic. He composed several operas, but they were one after another condemned almost at the first hearing. His talents, however, were not without recognition, for he was not only a member of the academy of fine arts, but also librarian of the conservatoire, officer of the legion of honor, and the recipient of a number of foreign orders. He sought to promulgate his views of composition not only in his own but also in other countries, and for that purpose at various times visited England, Germany, Austria, and Russia, but without any other than a transient effect. He published a treatise on instrumentation which is held in esteem. His principal instrumental works are the overtures to "Waverley," "King Lear," *Le Carnival romain*, and *Les francs juges*, and the symphonies entitled *Episode de la vie d'un artiste*, *Harold en Italie*, and *Symphonie funèbre et triomphale*. Among his operas, those most worthy of mention are *Benvenuto Cellini* and *Les Troyens*. In 1833 he married Miss Harriet Smithson, an English actress, who died in Paris in 1854. His life was passed in a constant struggle, through his musical compositions and his writings, to impress his theories upon the world.

BERMEJO, or Vermejo, a large river of South America, rises in the Tarija mountains in Bolivia, flows S. E. through the Argentine provinces of Jujuy and Salta, meandering through the dense forests and sandy plains of the Gran Chaco, where it receives the waters of some lakes and forms a large number of others, and falls into the Paraguay near the fortress of Humaitá, 30 m. above the confluence of that river with the Paraná. Its chief affluents are the Tarija and the Labayen or Rio Grande de Jujuy. It is extremely tortuous, and its entire length is 1,200 m., although less than 600 m. in a straight line. Its course generally varies five or six times in a league. José Maria Arce, who descended it in 1863 in vessels drawing but 27 inches of water, and with 150 tons of cargo, from Oran in Jujuy to Corrientes, found the river nowhere less than five feet deep; but sunken trees frequently obstructed navigation.

BERMONDSEY, a suburban parish of London, on the Surrey side of the Thames, situated between Southwark and Rotherhithe, and forming part of the former borough; pop. in 1871, 80,413, an increase of 22,058 since 1861. It is the great seat of tanning. (See LONDON.)

BERMUDAS, or Somers Islands, a group of small islands belonging to Great Britain, said to be 365 in number, in the Atlantic ocean, 580 m. S. S. E. of Cape Hatteras, between lat. 32° 14′ and 32° 25′ N., and lon. 64° 38′ and 64° 52′ W. The group is formed upon a coral reef, and is 18 m. in length and 6 in greatest breadth; area, 24 sq. m.; pop. in 1871, 12,121, including about 5,000 whites. The land is low, the greatest elevation being that of Gibbs Hill, 180 feet high, on which there is a lighthouse. Most of the islands are mere rocks, and only 12 or 15 are inhabited. Bermuda, or Long Island, is 16 m. long and about 1½ m. wide. The other principal islands are St. George's, Ireland, Somerset, and St. David's. Dangerous and extensive coral reefs, mostly under water, enclose them on the north, west, and south, and the channels of approach are very intricate. They have some excellent harbors, however, that of St. George's, the easternmost island, having been formed at great cost by blasting away the reefs and constructing a breakwater on the point of the adjacent island of Ireland. St. George is now an important naval station, and is strongly fortified. The climate is damp, but mild. Violent gales are frequent during the winter. Vegetation is green throughout the year, and the islands yield abundance of garden vegetables, potatoes, fruit, and excellent arrowroot. Grain, flour, rice, and live stock are imported from the United States. The soil, a thin layer of mould upon a rocky foundation, is still fertile, though much overworked. A good quality of cedar grows on the islands, and is extensively used for building small and swift vessels. There are no fresh-water streams nor good wells; rain water is collected in tanks. The fisheries are valuable. Limestone and sandstone are abundant. The only towns are Hamilton, the capital, on Bermuda island, and St. George, on the island of that name, the latter being the larger of the two. The government consists of a governor and council appointed by the crown, and an assembly of 36 members elected by the people. The revenue in 1869 was £30,040; expenditure, £32,040; public debt,



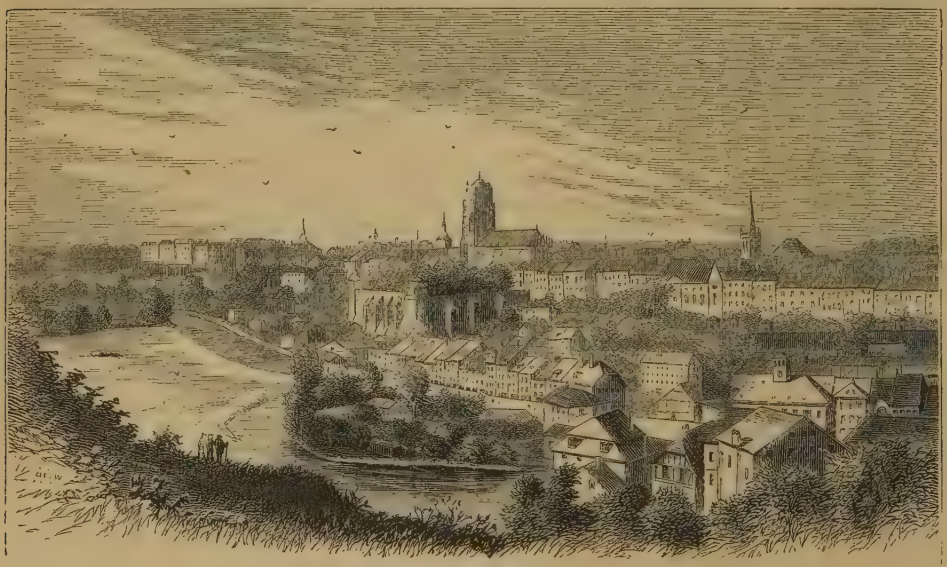
View in the Bermudas, with Hamilton in the distance.

£8,000; imports from the United Kingdom in 1870, £54,933; exports to the United Kingdom, £8,928. A penal colony has been established on the islands, and the convicts are employed on the public works. There is an admiralty school on Ireland island, and private and free schools, churches, and chapels are numerous.—In 1522 Juan Bermudez, a Spaniard, was wrecked upon these islands while on a voyage from Spain to Cuba with a cargo of hogs. Sir George Somers was wrecked upon them in 1609 on his way to Virginia. In 1614 the islands were settled under a charter from James I., and in 1640 a regular government was established. The islands prospered, and during the civil wars many persons of position and wealth took refuge on them. Among them was the poet Waller, who sang their beauties in the "Battle of the Summer Island." They are called in Shakespeare's "Tempest" the "still vexed Bermoothes."

BERMUDEZ, Geronimo, a Spanish poet, born in Galicia about 1530, died about 1589. He belonged to the order of St. Dominic, and was professor of theology at Salamanca. He published at Madrid in 1577, under the name of Antonio de Silva, two tragedies upon the subject of Inez de Castro, *Nise Lastimosa* and *Nise Laureada*. The former is much the finer poem, and has passages of great poetical merit. He also published a poem originally written in Latin, and translated by himself into Spanish, entitled *La Hesperoida*, of which the duke of Alva was the hero.

BERN, or **Berne. I.** A canton of Switzerland, bounded N. W. by France and the German province of Alsace, N. E. and N. by Basel and Solothurn, E. by Aargau, Lucerne, Unterwalden, and Uri, S. by Valais, and W. by Vaud, Fribourg, and Neufchâtel; area, 2,660 sq. m.; pop. in 1870, 506,561, of whom about five sixths are Germans and the rest French. The ranges of the Jura extend through the northern part of the canton, and the Bernese Alps are in the south. Among these in the S. E. corner rises the river Aar, which, after passing through Lakes Brienz and Thun, flows N. W. through the centre of the canton. Its principal tributaries in Bern are the Simmen, the Saane, the Thiele from Lake Bienne, and the Emmen. Along the lower Aar and Emmen the country is level with undulations. Deep valleys are found between the ranges of the Jura and amid the Alps. Those in the southern part of the canton, which is called the Oberland, are particularly celebrated for their beauty; the most famous are those of Hasli, Grindelwald, Lauterbrunnen, that of the Simmen, and the plain of Interlaken. The highest points of the Bernese Alps are the Finsteraarhorn, the Jungfrau, the Mönch, the Schreckhorn, the Eiger, and the Wetterhorn, from 12,000 to 14,000 ft. high. Many strangers are attracted to the canton by its wild and romantic scenery. The climate is healthful, but in temperature varies with the elevation. There is a corresponding variation in the soil. The valley of the Emmen is extremely fertile. The valleys of the Oberland are less so. On the sides of the mountains excellent pastures are found. These change higher up into barren rocks, and at a still greater elevation into glaciers. In the Jura iron and copper are mined, and watches and wood carvings are made. The canton exports cheese, but is sometimes obliged to import potatoes and grain. A railway crosses the northern part, and several railways centre in the city of Bern. The canton is divided

into 30 districts. Among the more important communes are Brienz, Unterseen, Thun, Langnau, Arberg, Bienne, and Porrentruy. Besides the university of Bern, the canton has 3 gymnasia and 5 schools preparatory for them, 29 *Realschulen* and secondary schools, 1,412 primary schools upon which attendance is compulsory, and 6 normal schools.— In 1191 Berchtold V., duke of Zähringen, fortified his castle of Nydeck, upon the promontory where the city of Bern now stands, as a place of refuge for the lesser nobles, and gave a charter to the city. The canton was formed out of the territory which was from time to time acquired by the city, and in 1353 joined the Swiss confederation. In 1528 it placed itself upon the side of the reformation, and having in 1536 conquered the Pays de Vaud from Savoy, its territory for nearly three centuries extended from the lake of Geneva to the Rhine. During this period its government from being democratic became aristocratic and oligarchical. The armies of the French republic invaded the canton in 1798, took the city of Bern, and seized its treasury, containing 30,000,000 francs. In 1803, by Napoleon's act of mediation, Aargau and Vaud were separated from Bern. In 1815, to compensate for the loss of Aargau and Vaud, the territories of the bishop of Basel were taken from France and added to Bern, and an aristocratic tone was given to the institutions of this "Venice of the Alps," as the canton has sometimes been called. In 1831 a more democratic constitution was adopted, and still another in 1846. Under this the government is vested in a grand council, which delegates its power to a smaller body called the council of administration. The chief judicial power is given to a supreme court of 15 members with 4 substitutes. Under the constitution of Switzerland which was promulgated Sept. 12, 1848, the canton sends 23 members to the *Nationalrath* or lower house of the Swiss diet. In 1870 the *referendum* was introduced, which provides that every law adopted by the legislature must be ratified by the people before it can become valid. The revenue and expenditure of the canton in 1870 amounted to about 5,200,000 fr.; public debt, 20,000,000 fr. **II.** A city, capital of the canton and of Switzerland, situated upon a promontory of sandstone around which flows the Aar with steep and precipitous banks, 43 m. S. of Basel; pop. in 1870, 36,002, of whom 2,644 were Roman Catholics, 303 Jews, and the remainder Protestants. The lofty Nydeck bridge by which it may be entered from the east is one of the most gigantic structures of Switzerland. The city is handsomely built, with broad straight streets, many of the houses resting upon arcades. By means of the Gasel, a brook introduced into the city in 1868, fountains are supplied and rills made to flow through many of the streets. The capitol of the confederation was completed here in 1857, and cost 2,145,471 fr. The high clock tower, built by Berchtold of Zähringen in 1191, is near the middle of the city. Every hour its works set in motion puppets which represent a cock, a procession of bears, and a bearded old man with an hour glass, who strikes a bell. The cathedral faces a terrace 108 feet above the Aar, from which a fine view may be had of the Oberland Alps. It was begun in 1421 under the supervision of Matthias Heinz, son of one of the architects of Strasburg cathedral, to which



Bern, Switzerland.

it is equal in some of its details. The other most noted buildings are the churches, the library and museum, the mint, the orphan asylum, the hospital, the arsenal, the university buildings, &c. The university was founded in 1834, and in 1871 had 73 professors and 319 students. A school of arts was founded in 1871. The manufactures are cloth, printed linen, silk and cotton fabrics, and straw hats. The corporation of the city is so rich that it furnishes the citizens with fuel gratis, and has a surplus. The scenery is of the most picturesque character, and the city is much frequented by strangers. The wall ditches are renowned for bears, the bear being the heraldic animal of Bern, which derives its name from it. The armory, the richest in Switzerland, is full of ancient weapons and curiosities.

BERNADOTTE, Jean Baptiste Jules, marshal of the French empire and king of Sweden and Norway, born at Pau, Jan. 26, 1764, died in Stockholm, March 8, 1844. He was the son of a lawyer, and was educated for that profession, but enlisted in 1780 in the royal marines. When the French revolution broke out his advancement became rapid. In 1792 he served as colonel in Custine's army; commanded a demi-brigade in 1793; was in the same year, through Kléber's patronage, promoted to the rank of brigadier general; and contributed, as general of division in the army of the Sambre and Meuse, under Kléber and Jourdan, to the victory of Fleurus, June 26, 1794, the success at Jülich, and the capitulation of Maestricht. He also did good service in the campaign of 1795–'6 against the Austrian generals Clairfait, Kray, and the archduke Charles. At the beginning of 1797 he was ordered by the directory to march with 20,000 men as reenforcements to the Italian army, and it was upon his arrival in Italy that his first interview with Bonaparte took place. During the invasion of Friuli and Istria Bernadotte distinguished himself at the passage of the Tagliamento, where he led the vanguard, and at the capture of the fortress of Gradisca, March 19, 1797. After the 18th Fructidor, Bonaparte ordered his generals to collect from their respective divisions addresses in favor of the *coup d'état* of that day; but Bernadotte sent an address to the directory different from that which Bonaparte wished for and without conveying it through Bonaparte's hands. After the treaty of Campo Formio Bonaparte made Bernadotte a friendly visit at his headquarters at Udine, but immediately after deprived him of half his division of the army of the Rhine, and commanded him to march the other half back to France. Bernadotte was much dissatisfied, but finally accepted the embassy to Vienna. Having been reprimanded by the directory because he had not placed the emblem of the republic upon the outside of his hotel, Bernadotte hoisted the tri-colored flag with the inscription "Liberty, equality, fraternity." This was done upon a day on which a public anniversary was celebrated at Vienna, April 13, 1798. His hotel was stormed by a mob, his flag burnt, and his life endangered. Satisfaction having been refused, Bernadotte withdrew to Rastadt with all his legation. The directory, however, on the advice of Bonaparte, waived the claim for satisfaction and recalled Bernadotte to Paris. He married in August, 1798, Mlle. Désirée Clary, the daughter of a Marseilles merchant and Joseph Bonaparte's sister-in-law. In November of the same year he was made commander of the army of observation on the upper Rhine. After the *coup d'état* of the 30th Prairial, 1799, he was made minister of war, and in that office rendered valuable services. On the morning of Sept. 13 he found his resignation announced in the *Moniteur* before he was aware that he had tendered it. This was a trick played upon him by Sieyès and Roger Ducos, the directors allied to Bonaparte. Although solicited to do so by Bonaparte, Bernadotte refused to take part in the revolution of the 18th Brumaire (Nov. 9, 1799), by which the directory was abolished and supreme power conferred on Napoleon. Placed in command of the army of the west, he restored tranquillity to La Vendée. After the proclamation of the empire in 1804 he was made a marshal, and was intrusted with the command of the army of Hanover. In this capacity, as well as during his later command of the army of northern Germany, he created for himself a reputation for independence, moderation, and administrative ability. At the head of the corps stationed in Hanover, which formed the first corps of the grand army, he participated in the campaign of 1805 against the Austrians and Russians. In the battle of Austerlitz he was posted with his corps in the centre between Soult and Lannes, and contributed to baffle the attempt of the right wing of the allies to outflank the French army. On June 5, 1806, he was created prince of Ponte-Corvo, a district of Naples formerly subject to the pope. During the campaign of 1806–'7 against Prussia he commanded the first corps d'armée. After the battle of Jena, Oct. 14, 1806, Bernadotte defeated the Prussians at Halle, Oct. 17, pursued conjointly with Soult and Murat the Prussian general Blücher to Lübeck, and aided in forcing his capitulation at Radkow, Nov. 7. He also defeated the Russians at Mohrungen, Jan. 25, 1807. After the peace of Tilsit, according to the alliance concluded between Denmark and Napoleon, French troops were to occupy the Danish islands, thence to act against Sweden. Accordingly, in 1808, while Russia invaded Finland, Bernadotte was commanded to move upon Seeland in order to penetrate with the Danes into Sweden to dethrone its king, and to partition the country between Denmark and Russia. He passed the Belt and arrived in Seeland at the head of 30,000 Frenchmen, Dutch, and Spaniards; most of the latter, however, by the assistance of the English fleet, decamped under Gen. de la Ro-

mañia. Being recalled to Germany to assist in the new war between France and Austria, he received the command of the 9th corps, which was mainly composed of Saxons. At the battle of Wagram he commanded this corps, of which the division of Gen. Dupas formed part. Having resisted on the left wing for a long time an attack from a superior force, he ordered Dupas forward to his support; the latter replied that he had orders from the emperor to remain where he was. After the battle Bernadotte complained to Napoleon for having in violation of all military rules ordered Gen. Dupas to act independently of his command, and for having thereby caused great loss of life to the Saxons, and tendered his resignation; and Napoleon accepted it after he had become aware of an order of the day issued by Bernadotte in which he gave the Saxons credit for their courage in terms inconsistent with the emperor's official bulletin. Bernadotte having returned to Paris, the Walcheren expedition (July, 1809), caused the French ministry in the absence of the emperor to intrust him with the defence of Antwerp. In a proclamation issued to his troops at Antwerp he made a charge against Napoleon of having neglected to prepare the proper means of defence for the Belgian coast. He was deprived of his command, and ordered on his return to Paris to leave it for his princedom of Ponte-Corvo. Refusing to comply with the order, he was summoned to Vienna, and after an interview with Napoleon at Schönbrunn accepted the general government of the Roman states. He was making his preparations to enter upon this office when the Swedish diet elected him crown prince of Sweden, Aug. 21, 1810. The king, Charles XIII., who in 1809 had succeeded the dethroned Gustavus IV., adopted him as his son under the name of Charles John. Before freeing Bernadotte from his allegiance to France, Napoleon asked him to agree never to take up arms against France. Bernadotte having refused to make any such agreement, upon the ground that his obligations to Sweden would not allow it, Napoleon signed the act of emancipation unconditionally. Landing at Helsingborg, Bernadotte there abjured the Catholic religion, and entered Stockholm Nov. 1. During the king's sickness, in the following year, Bernadotte acted as regent. Napoleon compelled him to accede to the continental system and declare war against England; but the declaration was treated by both England and Sweden as being merely nominal. Napoleon suppressed the crown prince's revenues as a French prince, declined to receive his despatches, and sent back the order of the Seraphim bestowed by him upon the new-born king of Rome. Finally French troops in January, 1812, invaded Swedish Pomerania and the island of Rügen; whereupon Sweden concluded an offensive alliance against France with Russia. In this treaty the annexation of Norway to Sweden was stipulated. When Napoleon declared war against Russia, Bernadotte was for a time the arbiter of the destinies of Europe. Napoleon offered him, on the condition of his attacking Russia with 40,000 Swedes, Finland, Mecklenburg, Stettin, and all the territory between Stettin and Volgast. But Bernadotte remained upon the side of Russia. He mediated the peace of Orebro, concluded about the same time between England on the one side and Russia and Sweden on the other. After the French retreat from Moscow, when England guaranteed him Norway, he entered the coalition. He assisted the emperor Alexander and the king of Prussia in the formation of their plans for the campaign of 1813, in which as crown prince of Sweden he was commander-in-chief of the army of the north. In this campaign, after having defeated Oudinot at Grossbeeren, he gained a victory (Sept. 6) over Ney at Dennewitz, and joined in the battle of Leipsic in time to contribute materially to the victory of the allies. After that battle he marched upon Denmark by way of Hanover; and he forced Frederick VI. to sign the treaty of Kiel, Jan. 14, 1814, by which Norway was ceded to Sweden. When the allies entered France the crown prince followed slowly, and stopped on the frontier. After Napoleon's abdication he repaired personally to Paris, where his reception by the allies was not particularly cordial; but on his return to Sweden the treaty of Kiel was guaranteed by the five great powers. The representatives of Norway, assembling at Eidwold, adopted the constitution which is still in force. This constitution Bernadotte agreed to accept, and obtained the assent to it of the Swedish assembly (*storthing*). Charles XIII. expired Feb. 5, 1818, and Bernadotte was acknowledged throughout Europe as king both of Sweden and Norway under the name of Charles XIV. John. Although ignorant of the language of the countries over which he reigned, Bernadotte as king succeeded in overcoming all the difficulties which arose in either country. During his long reign of 26 years education was promoted, agriculture, commerce, and manufactures prospered, and the means of internal communication were increased. (See SWEDEN.) He was succeeded by his only son, Oscar.

BERNALILLO, an E. central county of New Mexico, divided into two portions by the S. projection of San Miguel county, the E. portion bordering on Texas; area, about 3,000 sq. m.; pop. in 1870, 7,591. The W. portion is intersected by the Rio Grande del Norte and Rio Puerco, and is skirted by the Rio de San José. In this portion are the Sandia and other mountains. The chief productions in 1870 were 18,300 bushels of wheat, 31,505 of Indian corn, 14,080 gallons of wine, and 166,960 lbs. of wool. There were 373 horses, 509 mules and asses, 622 milch cows, 2,016 other cattle, 126,010 sheep, and 446 swine. Capital, Albuquerque.

BERNARD, a saint and doctor of the Latin church, born at Fontaines, in Burgundy, in

1091, died in the abbey of Clairvaux, Aug. 20, 1153. His father, Tescelin, was a knight of the house of Châtillon, and his mother, Aleth, was a daughter of Count Bernard of Montbard. Bernard was the third of a family of seven children. From the beginning he was destined to a clerical life, and he astonished his masters by his rapid progress in learning. After the death of his mother, when he was 19 years old, he resolved to enter the cloister, and to persuade his brothers to join him. Andrew and Bartholomew, younger brothers, were easily won. Guy, the eldest, was for a time retained by his wife, but she at last consented to go to a nunnery. A rich and warlike uncle was the next proselyte. Gérard, the second brother, was more insensible, but his obstinacy was disarmed by a vision. The rule chosen by the brethren was the new Cistercian rule. Bernard's discipline was rigorous in the extreme, His labors were severe, his fastings protracted; his sensibilities were blunted by various exposure, till he lost almost all sense of outward impressions. His meagre and haggard frame was a fearful witness of the struggles of the soul in its contest with the body. His novitiate year brought numerous converts, including Nivard, Bernard's youngest brother. The year of novitiate was passed by the brethren in the convent of Cîteaux. In this time several new convents had been founded in the neighborhood. In 1115 Bernard, with 12 monks, among whom were his brothers, was sent out to find in the province of Champagne a suitable place for a Cistercian community. He chose a wild gorge in the diocese of Langres, noted as a haunt of robbers, the name of which was the "Valley of Wormwood." He changed the name to Clairvaux, or "Beautiful Valley." The numbers of the brotherhood rapidly multiplied. Their charities were the praise of all the region. Men came to Clairvaux to be healed of their infirmities by one whom sickness had reduced almost to spiritual proportions. Compelled by superior authority to submit himself to a physician, Bernard, against his will, recovered. Henceforth, recognizing his own weakness of body, he was less enthusiastic in his austerities. The 12 succeeding years of his life were devoted to the reform and direction of the convents already established, or suggestions concerning new establishments. His correspondence was vast, and he gave audience to great numbers who came to consult him. His studies were not less vigorously prosecuted, both in Scriptural and patristic lore. Augustine's theology and the Canticles of Solomon were his favorite themes. In 1124 Humbeline, his only sister, and the last of his family, took the veil in one of the convents of his foundation. Bernard was repeatedly called abroad to reconcile disputes between bishops and their dioceses, between the church and the nobles. He persuaded Abbot Suger, prime minister of Louis the Fat, to relinquish his secular station and confine himself at St. Denis to his religious charge. He supported Henry, archbishop of Sens, and Stephen of Paris, in their appeal to Rome against the king. At the council of Troyes, in 1128, he vindicated the canons of the church, and took part in those stormy debates about the excesses of the Templar knights. At the council of Châlons, 1129, he assisted to depose the bishop of Verdun. Repeated offers of lucrative sees were steadily refused by him. In 1130 a schism was caused by the pretensions of the cardinal of Leon, who claimed the papacy, under the title of Anacletus, in opposition to Innocent II. At the council of Étampes Bernard gave his support to Innocent, procured a decree in favor of the exile, and then visited the principal courts of Europe to plead Innocent's cause. He secured the countenance of England, accompanied Innocent to Germany, and with some difficulty induced the emperor Lothaire not only to acknowledge him as pope, but to renounce the privilege of investiture. In 1132 Bernard accompanied Innocent into Italy. The division between its various states tended to hinder the restoration of Catholic unity. Genoa, whose jealousy of Pisa was obstinate and deep-rooted, was subdued by the preaching of the abbot, until the people almost forced him to stay as their chief bishop. Pisa in turn yielded to his eloquence. In Milan he found a harder task; but here, too, he succeeded, and the Milanese also demanded him for their bishop. Returning after five years of conflict to Clairvaux, he found its affairs peaceful and prosperous. Count William of Aquitaine, the most violent of the adherents of Anacletus, kindled a fresh schism and deposed bishops who supported Innocent. Failing in his argument with this man, Bernard tried an experiment, such as Ambrose had tried with Theodosius. After the consecration at mass, he went toward the count with the wafer and paten in his hands, and threatened him with the judgment of the Lord unless he desisted from the persecution of the church. The count fell prostrate and penitent at his feet, and two years later died on a pilgrimage. In 1137 Bernard was summoned from his convent to plead the cause of Innocent before King Roger of Sicily, who had possessed himself of Rome. The necessity of unity in the church, and the right of majorities to decide disputed questions, were arguments which Roger and his partisans could not well resist. The death of Anacletus weakened the schism still further; and, although the form of electing his successor was tried, the party were forced to confess themselves vanquished, and the abbot received the testimonies of their final submission. Innocent was installed at Rome, and Bernard was able to see the fruit of his eight years of toil and contest. A visit to the convent of the Paraclete, of which Héloïse was abbess, had acquainted Bernard with the views and principles of Abélard. Through Bernard's influence, in the year 1140, a council was held at Sens to consider those opinions. From a conviction that his cause was hopeless,

or from fear as some say, Abélard did not justify himself before the council, and his default was pronounced, with his sentence as a heretic. His death, during the journey which he was making to Rome, saved his adversary from the annoyance of further controversy. In this and subsequent years Bernard's life was embittered by misunderstandings with the pope, who preferred the good will of the secular powers to the friendship of the monk who had placed him on the papal throne. His influence at Rome, however, was soon regained. After the short reigns of Celestine II. and Lucius II., one of his own spiritual children, another Bernard of Clairvaux, was called to the chair of St. Peter as Eugenius III. The new pope soon intrusted to Bernard the duty of preaching a fresh crusade. Bernard passed through France and Germany, arousing indifference, inflaming piety, opening the coffers of the rich, and calling all to the holy war. His success was instant and wonderful. More than once his robe was torn to shreds in furnishing crosses to the eager volunteers. He writes to Eugenius that the cities and castles are deserted, that the wives are becoming widows, and that there is hardly one man to seven women. Soon he had to moderate the excitement and check the excesses of the host which he had gathered. He strove especially to prevent the persecution of the Jews, which was the first sign of the new Christian fury. In 1147 the two great expeditions set out. Confusion marked their way, and disaster followed them. The Greek emperor suffered the German forces to be cut to pieces by the Moslems. The French expedition was equally unfortunate, and, though a fragment reached Syria and laid siege to Damascus, the climate and vices of that region finished the destruction which the fortunes of war had begun. The weight of the blame was thrown upon the advisers of the expedition, and Bernard, who had protested against the blunders of the campaign, was cursed for its fatal result. His fame, however tarnished by this disaster abroad, was retrieved by his successful warfare with new heresy at home. He cleansed Languedoc from the scandal which Henry of Lausanne and Peter de Bruis, the Cathari or Purist leaders, had brought upon that province. At the council of Rheims, in 1148, he refuted the Sabellian bishop, Gilbert of Poitiers. It was proposed to engage him in a new crusade, but he refused. His last five years were passed in comparative retirement, varied only by literary occupations and the visits of distinguished friends. Gumard, king of Sardinia, and Pope Eugenius, were at different times his guests. The "burning and shining light of the Irish church," Malachi, saint and bishop, died on a visit to Clairvaux, and Bernard wrote his life. The abbess Hildegard found in Bernard a friend who vindicated her at Rome, and believed that her gift of prophecy was real. In these last years the most remarkable of Bernard's compositions were written. His body was buried in the church at Clairvaux, and in 1165 his name was set in the calendar of the church by Pope Alexander, though it was not openly proclaimed among the saints till 1174. Bernard founded 35 monasteries in France, 11 in Spain, 10 in England and Ireland, 6 in Flanders, 4 in Italy, 2 in Germany, 2 in Sweden, 1 in Hungary, and 1 in Denmark. At Clairvaux at the time of his death there were 700 brethren. His treatises, authoritative as they still are, have been superseded by the works of Aquinas and Bellarmin, and his sermons do not justify his singular fame for pulpit eloquence. It needs nice discrimination to separate his genuine writings from those which have been falsely attributed to him. The former comprise epistles, sermons, and moral and theological treatises. Of the epistles 480 are contained in the collections of Mabillon and Martène, 439 of which were the work of Bernard himself, the remainder being either addressed to him or drawn up by his secretary. The general characteristics of his letters are earnestness, energy, clearness of expression, and a fierce sincerity. The style is unequal, in most instances rugged and harsh. The sermons include 86 on the Canticles of Solomon, 86 on the events of the ecclesiastical year, 43 on the saints and the Virgin, and 125 miscellaneous. They are cold, ethical, sometimes even obscure. The other works of St. Bernard include treatises on "The Love of God;" "Grace and Free Will;" "Twelve Degrees of Humility and Pride;" baptism and the incarnation, in a letter to Hugo of St. Victor; "Conversion," addressed to the clergy; an "Apology" for his order, in reply to the censure of certain Benedictines; "Exhortations to the Knights Templar;" "Errors of Abélard;" "Precepts and Dispensations;" and a work on "Consideration," suggested by the visit of Pope Eugenius to his monastery, and dedicated to that pontiff. The standard edition of his writings is that of Mabillon (2 vols. fol., 1690). This contains valuable notes, in addition to the edition of 1667. A new edition appeared in 1719 and in 1726. Another less valuable but more convenient edition, by the same famous Benedictine, is in 9 vols. 8vo. The most accessible biographies are those of Neander (Berlin, 1841), Montalembert, Daunon in vol. xiii. of "French Literary History," Abel Desjardins (Dijon, 1845), the abbé Ratisbonne (2 vols., Paris, 1846), and J. C. Morison (London, 1863).

BERNARD, Claude, a French physiologist, born at Saint Julien, department of the Rhône, July 12, 1813. He studied in Paris, and became in 1854 incumbent of the newly established chair of general physiology in the faculty of sciences, and member of the academy; in 1855 professor of experimental physiology at the collége de France; and in 1868 professor of general physiology at the museum. He established his reputation by his *Recherches sur les usages du pancréas*, to which the academy awarded a prize in 1846, and which was published in 1856

in the academical annals. His other works include *La fonction glycogénique du foie* (1849); *Recherches expérimentales sur le grand sympathique et sur l'influence que la section de ce nerf exerce sur la chaleur animale* (1854); *Leçons de physiologie expérimentale appliquée à la médecine* (2 vols., 1855–'6); *Leçons sur les propriétés physiologiques et les altérations pathologiques des différents liquides de l'organisme* (2 vols., 1859); *Leçons et expériences physiologiques sur la nutrition et le développement* (1860); and *De la physiologie générale* (1872). The last named work received a valuable prize from the academy. His most important discoveries relate to the functions of the liver.

BERNARD, Sir Francis, colonial governor of New Jersey and Massachusetts, born in Nettleham, England, in 1714, died in London, June 16, 1779. He was a lawyer, was appointed governor of New Jersey in 1758, and transferred in 1760 to Massachusetts, where he favored all the pretensions of the crown, brought troops into Boston, and prorogued the general court when it refused to make provision for their support. That body before it dispersed unanimously voted a petition to the king humbly entreating that Bernard might be removed for ever from the government of the province. He was recalled in 1769, and as he departed from Boston the bells were rung, cannon fired after him from the wharves, and the liberty tree hung with flags. The English government manifested its approbation of his course by creating him a baronet. He was a man of erudition and a patron of Harvard college.

BERNARD, Jacques, a French writer, born at Nyons, Sept. 1, 1658, died April 27, 1718. In 1679 he became pastor of the Reformed church at Vinsobres. During the persecutions that preceded the revocation of the edict of Nantes his church was destroyed and he fled to Switzerland, where he gave lessons in mathematics and French. He afterward went to the Hague and opened a school for belles-lettres, philosophy, and mathematics. He continued the publication of the *Bibliothèque universelle* which had been undertaken by Leclerc, and in 1693 succeeded Bayle as editor of the *Nouvelles de la république des lettres*, and, although very inferior to his predecessor, continued to conduct it till his death, with the exception of the interval from 1710 to 1716. He published several historical and religious works, including a history of Europe in 5 vols., of the peace of Ryswick in 5 vols., and a collection of treatises since the time of Charlemagne in 4 vols.

BERNARD. I. John, an English comedian, born in Portsmouth in 1756, died in London, Nov. 29, 1828. His first appearance in London was in 1787 at Covent Garden theatre, as Archer in "The Beaux Stratagem," and was very successful. He was secretary for nine years of the celebrated Beefsteak club. In 1797 he appeared for the first time in the United States at Birkett's circus (then fitted up as a theatre), Greenwich street, New York, as Goldfinch in the "Road to Ruin." He was one of the managers of the Boston theatre for several years, and finally returned to England in 1813. His "Recollections of the Stage" relates his adventures up to the period (June, 1797) when he went to America, or during one half of his theatrical career. The book was not popular, and the second part never appeared. **II. William Bayle,** an English dramatist, son of the preceding, born in Boston, Mass., Jan. 1, 1808. He went to England with his father, whose "Recollections of the Stage" he prepared, and wrote "The Nervous Man and the Man of Nerve," "The Irish Attorney," "The Mummy," "His Last Legs," "Dumb Belle," "A Practical Man," "The Middy Ashore," "The Boarding School," "The Round of Wrong," "A Splendid Investment," and "A Life's Trial."

BERNARD, Simon, a French general and engineer, born at Dôle, April 28, 1779, died in Paris, Nov. 5, 1839. He was educated at the polytechnic school, led the assault upon Ivrea in 1800, served in various subsequent campaigns, was made aide-de-camp to the emperor in 1813, and throwing himself into Torgau with 8,000 men superintended the defence of that place for three months during a terrible siege. In 1814 he gave in his adherence to Louis XVIII. and was appointed brigadier general, in 1815 again fought on the side of Napoleon at Waterloo, and once more entered the service of Louis XVIII.; but having been ordered to leave Paris for Dôle, he obtained permission from the king to go to the United States. He there entered the service of the government, devised a system of canals and roads for connecting the great lakes and navigable rivers, and a scheme for the defence of the coast, and constructed Fortress Monroe, some of the defences of New York, and other works. Upon the revolution of 1830 he returned to France, and was intrusted by Louis Philippe with the preparation of plans for the fortification of Paris. He was strongly in favor of the system of detached forts which was afterward carried out. In 1834 he was for a short time minister of war, and *ad interim* of foreign affairs. In 1836 he was made minister of war a second time, and held that office till 1839.

BERNARD, Saint, Great and Little. See SAINT BERNARD.

BERNARD OF TREVISO, an Italian alchemist, born at Padua in 1406, died in 1490. He assumed the title of count of the March of Treviso, devoted his life and a large fortune to experiments and travels in search of the philosopher's stone, and after much observation and study arrived at the principle, "To make gold, gold is needed." In one of his many works he describes the trials and disappointments of an alchemist's life; and in his treatise *De Miraculo Chemico* he develops a curious theory in regard to the origin of heat.

BERNARDIN OF SIENA, Saint, born at Massa, Italy, Sept. 8, 1380, died at Aquila, May 20, 1444. He showed remarkable courage and de-

votion during a pestilence which ravaged Siena in 1400. Having joined the order of St. Francis, he was sent to the Holy Land, and after his return preached 14 years with great success. He refused the bishoprics of Siena, Ferrara, and Urbino, but accepted the office of vicar general of the Franciscans, in order to restore what he conceived to be the original discipline. He founded 300 monasteries. Those who embraced his reform constituted the branch of the Observantines. His eloquence was exerted with great effect for the reconciliation of the Guelphs and Ghibellines. In 1450 he was canonized by Pope Nicholas V. His works appeared in Venice in 1591 in 4 vols. 4to, and at Paris in 1636 in 2 vols. folio. They consist of essays on religious subjects, sermons, and a commentary on the book of Revelation.

BERNARDIN DE ST. PIERRE. See SAINT PIERRE.

BERNARDINES, a name given in France and Spain to some of the Cistercian monks and nuns. See CISTERCIANS.

BERNARDO DEL CARPIO, a Spanish warrior of the 9th century, probably born in the castle of Carpio, Valencia. He was the offspring of a secret marriage between Don Sancho de Saldaña and Ximena, sister of Alfonso II., the Chaste, of Leon. The king on the discovery of the marriage had Saldaña imprisoned and blinded, and Ximena sent to a convent. Bernardo was brought up at court, and acquired renown in the warfare against the Moors, which he continued even after he had left his uncle's service in consequence of the failure of repeated efforts to obtain his father's release. Finally in his exasperation he joined the Moors, and took up his headquarters at the castle of Carpio, upon which Alfonso promised to relent on condition of the surrender of that stronghold. But Saldaña was not set free, and according to some authorities he was put to death either by Alfonso, who died in 842, or by his successor Alfonso the Great, while Bernardo was reported to have left Spain and to have acquired additional fame as a knight errant in France. The narrative of his exploits is associated with many romantic traditions, and there are different versions of his life, according to one of which he was kept for a long time in ignorance of his parentage, and on discovering it defied Alfonso, after taking possession of the castle in which his father was confined. He figures in many old Spanish chronicles and ballads, and in several plays by Lope de Vega, as a national hero and as the successful antagonist of Roland at Roncesvalles. An epic poem, *El Bernardo*, was published by Bernardo de Balbuena in Madrid in 1624 (new ed., 3 vols., 1808; abridged in *Poesías selectas castellanas*, by Quintana, 1833).

BERNAU, a town of Prussia, in the province of Brandenburg, 13 m. N. E. of Berlin; pop. in 1871, 5,466. The town hall contains many interesting Hussite antiquities from the year 1432, when the Hussites besieged the place.

BERNAUER, Agnes, the beautiful daughter of a bath-keeper of Augsburg, drowned Oct. 12, 1435. Albert, son of Ernest, duke of Bavaria, fell in love with her at a tournament, married her, and lived with her some time in happiness, despite the anger and persecution of his father. At last the duke, in Albert's absence, caused her to be arrested, tried, and found guilty of witchcraft. She was thrown into the Danube before a vast concourse of people, and when she swam or floated to the bank the executioner with a pole held her head beneath the water by her golden hair until she drowned. Albert rose in arms against his father and laid waste his territory. But the emperor Sigismund required him after a time to make peace, and he married Anna of Brunswick. His father erected a chapel over the grave of Agnes, and Albert made a foundation for the celebration of a daily mass for her. Several tragedies and poems have been founded upon the story.

BERNAY, a town of Normandy, France, department of Eure, on the left bank of the Charentonne, a branch of the Rille, and upon the railway from Paris to Cherbourg, 25 m. W. N. W. of Evreux; pop. in 1866, 7,510. A horse fair held here every year is the largest in France, and sometimes draws together 40,000 persons. The manufactures are of woollen cloth, linen, flannel, leather, and cotton yarn. Judith, wife of Richard II., duke of Normandy, founded here an abbey in 1027. Its chapel, one of the oldest examples of the Romanesque style of architecture in Normandy, is now used for a market hall. Near the city is an ancient Gothic church to which pilgrimages are made. The city was formerly the capital of the Pays d'Ouche, the level district that lies between the Charentonne and the Rille.

BERNBURG, a town of Anhalt, Germany, capital of a district of its name, and formerly of

Bernburg.

the duchy of Anhalt-Bernburg, on both sides of the Saale, 15 m. above its confluence with

the Elbe, 20 m. W. of Dessau; pop. in 1871, 15,716. It has an ancient castle with a fine garden, theatre, &c., adjoining, a town hall, hospitals, and schools of different grades. Sugar, paper, and iron castings are manufactured.

BERNERS, or **Barnes,** Lady **Juliana,** an English author, born at Rodney Berners, Essex, about 1388, died after 1460. She is said to have been a lady of rank and of great spirit and beauty, and was the prioress of the Sopewell nunnery near St. Albans, upon the abbey of which place the nunnery was dependent. A celebrated book on hawking, hunting, fishing, and coat armor is attributed to her. According to some accounts, the first edition of this book was printed at St. Albans in 1481. In the earliest extant edition, dated 1486, the work is entitled "The Bokys of Hawking and Hunting, and also of Cootarmuries." In some editions it is entitled "The Boke of St. Albans." It continued to be the most popular manual of field sports until the 18th century. A folio edition was printed by Wynkin de Worde in 1496, in which first appeared the part on fishing. A facsimile of this was printed in 1810 by Hazlewood, who subsequently investigated the claims of the author to be considered the first female writer in the English language. An edition of the "Treatise of Fysshynge" was printed by Baskerville in 1827.

BERNERS, John Bourchier, baron, an English statesman, born in 1474, died in 1532. He was the eldest son of Sir Humphrey Bourchier, and was descended from the duke of Gloucester, the youngest child of Edward III. He was a member of parliament from 1495 to 1529, took an active part in putting down the insurrection in Cornwall in 1497, was appointed by Henry VIII. chancellor of the exchequer in 1515, and in 1518 was associated with John Kite, archbishop of Armagh, in an embassy to Spain. Soon afterward he was appointed governor of Calais, and retained that office till his death. He wrote a translation of Froissart's Chronicles by the king's command; the first volume was published in 1523 and the second in 1525. He also translated other works from the French and Spanish, and wrote a comedy entitled *Ite in Vineam meam*, which was usually acted in the great church at Calais after vespers.

BERNETTI, Tommaso, an Italian cardinal and statesman, born in Fermo, Dec. 29, 1779, died there, March 21, 1852. In 1808 he followed Cardinal Brancadoro to France, and in 1810 to his exile at Rheims, whither Brancadoro was sent as one of the 13 "black cardinals" who refused to assist at the marriage of Napoleon and Maria Louisa. In 1814 he returned to Rome with Pius VII., and was appointed assessor of the committee of war, intrusted with the reorganization of the military service. Afterward he was sent as ambassador to St. Petersburg (1826), and as legate to Ravenna and Bologna. In 1827 he became a cardinal, and in 1828 was made secretary of state. After the accession of Gregory XVI. he undertook to create a militia which might obviate the necessity of employing Austrian troops. This led to remonstrances from the Austrian government, and to his being deprived of his office in 1836. He was then made vice chancellor of the Roman church. When Pius IX. left Rome in 1848 Bernetti joined him at Gaeta, and from that place went to Fermo.

BERNHARD, duke of Saxe-Weimar, born in Weimar, Aug. 6, 1604, died in Neuburg on the Rhine, July 8, 1639. He joined Gustavus Adolphus in 1631, and after the king's death in the battle of Lützen took the command and secured the victory. In 1633 he was made commander of half the Swedish army and invested with the dukedom of Franconia, which he lost the next year in consequence of his great defeat by the imperialists at Nördlingen. Not receiving, as he thought, proper support from Sweden, he formed a separate treaty with France at St. Germain-en-Laye, Oct. 17, 1635. In 1636, as commander-in-chief of the French auxiliaries and German troops, he achieved many victories in Lorraine, Burgundy, and Alsace, and in June, 1637, defeated the emperor's troops under Charles, duke of Lorraine. In 1638, cutting loose from the French alliance, he took Brisach, after having defeated three armies sent to its relief, and against the wishes of Richelieu occupied it with German troops. With a view to the establishment of an independent principality in Germany, he had entered into negotiations for a marriage between himself and Amelia, landgravine of Hesse, had continued his conquests in Burgundy, and was projecting the invasion of Bavaria, when he was seized with the disease which put a sudden end to his career, and which he attributed to poison administered by a hireling of Cardinal Richelieu. Upon his death Brisach passed with Alsace into the hands of the French.

BERNHARD, Karl, the pseudonyme of a Danish novelist named Saint Aubin, born about 1800, died in Copenhagen, Nov. 24, 1865. Among his works are: "Pictures of Life in Denmark," "Christian VII. and his Court," "Christian II. and his Times," and the "Chronicles of the Time of King Eric of Pomerania." Bernhard excelled in sketches of domestic life, and in delineations of Danish society. Two complete editions of his works have been published in German at Leipsic.

BERNI, Francesco, an Italian poet, born at Lamporecchio in Tuscany about 1490, died July 26, 1536. At the age of 19 he went to Rome and entered the service of Cardinal Bibiena, and subsequently obtained the situation of private secretary to Giberti, bishop of Verona. He assumed also the habit of an ecclesiastic, but the austerity of the bishop's household was not to his taste, and he sought the society of some young ecclesiastics who devoted themselves to wine, pleasure, and poetry. His principal works are the *Rime burlesche* and a new version of the *Orlando Innamorato* of Boiardo,

with additional verses of his own. At the sack of Rome in 1527 he lost all that he possessed and retired to Florence, where he lived as canon, enjoying the favor of the Medici.

BERNIER, François, a French traveller and philosopher, born in Anjou about 1625, died in Paris, Sept. 22, 1688. He first studied medicine, but his taste for travelling led him to Syria, to Egypt, and afterward to India, where he resided for twelve years, during eight of which he was physician to the emperor Aurungzebe. Under the protection of this prince and his ministers he was enabled to visit countries hitherto inaccessible to Europeans. Upon his return from his travels his society was much courted at Paris, and he was called, on account of the elegance of his person and of his manners, the *joli philosophe*. He published several volumes describing his travels, which have frequently been reprinted under the general title of *Voyages de Bernier, contenant la description des États du Grand Mogol*, and were translated into English (London, 1671–'5). He wrote an *Abrégé de la Philosophie de Gassendi* (8 vols., Lyons, 1678), and aided Boileau in the composition of the *Arrêt burlesque*, which saved the works of Aristotle from being condemned by the parliament of Paris.

BERNINA, a peak of the Rhætian Alps, in the canton of Grisons, Switzerland, 36 m. S. E. of Chur, 13,294 feet in height. It gives its name to the range of mountains that separate the valleys of the Engadine and Bregaglia from the Valteline. The Bernina pass, 7,672 feet above the sea, connects the Valteline with the upper Engadine valley.

BERNINI, Giovanni Lorenzo, an Italian sculptor and architect, born in Naples in 1598, died in Rome, Nov. 28, 1680. Having been presented by his father at an early age to Paul V., he drew the head of St. Paul in a manner which excited the admiration of the pope, and he recommended him to Cardinal Barberini. At the age of 18 he made a group of "Apollo and Daphne," which may still be seen at the villa Borghese. After Barberini became pope under the name of Urban VIII. (1623) Bernini was employed for nine years upon the bronze canopy over the tomb of St. Peter. He then built the niches in the four pillars that support the dome, and executed the statue of St. Longinus that stands in one of them. He afterward built the palazzo Barberini and executed the group of St. Theresa with the angel. Under Innocent X. he constructed the fountain in the piazza Navona and the palace of Monte Citorio. Among the many works he executed for Alexander VII. was the colonnade in front of St. Peter's. His fame spread throughout Europe. Louis XIV. in an autograph letter (April 11, 1665) invited him to take charge of the completion of the Louvre. His journey to France was a triumphal procession; but his plans involved the destruction of all of the Louvre that had already been built, and were never carried out. He returned to Italy in the spring of 1666 loaded with honors and with gifts. Upon his death at the age of 82 he left a large fortune.

BERNIS, François Joachim de Pierre de, a French cardinal and statesman, born May 22, 1715, at St. Marcel, department of Ardèche, died in Rome, Nov. 1, 1794. He was of a noble and ancient, but not wealthy family, and was destined from childhood for the church. He went to Paris, and after passing several years at the seminary of St. Sulpice entered society with the title of abbé, and by his personal appearance, graceful manners, and talent for making verses made a favorable impression. He was received into the French academy in 1744. Cardinal Fleury, a friend of his father, disapproved of his gay life; but after the death of the cardinal, through the favor of Madame Pompadour, he was appointed minister to Venice. While in that city (1751–'5), a difference having arisen between the republic and the pope, the abbé Bernis mediated between them. After his return to France he was made minister of foreign affairs and cardinal. As minister he negotiated, at the opening of the seven years' war, the alliance between Austria and France against England and Prussia. The war having led to the disastrous defeat of Rossbach, Cardinal de Bernis was compelled to send in his resignation as minister, and was exiled in 1758 to Soissons, where he remained till 1764, when he was recalled and made archbishop of Albi. Five years afterward he was sent as ambassador to Rome with instructions to labor for the suppression of the order of Jesuits. At Rome he distinguished himself in the conclaves of 1769 and 1774. He lived there in great magnificence until the French revolution deprived him of his revenues, after which he received till his death an allowance from the court of Spain. His letters to Pâris-Duvernay and a small volume of *Œuvres mêlées en prose et en vers* have been published.

BERNOULLI, or **Bernouilli,** a celebrated family of mathematicians and savants, originally of Antwerp, driven thence by Alva, settled first in Frankfort, and in 1622 in Basel, Switzerland. **I. James,** born in Basel, Dec. 25, 1654, died there, Aug. 16, 1705. He was destined by his father for the ministry, but accident having thrown some geometrical books in his way, he took for his device Phaëthon driving the chariot of the sun, with the motto, *Invito patre, sidera verso*, and devoted himself to the study of mathematics. In 1676 he visited Geneva, where he taught a blind girl to write, and thence travelled into France, where he constructed gnomical tables, and returned home in 1680. The appearance of a comet in that year led to his publishing an essay entitled *Conamen novi Systematis Cometarum*, in which he contended that the orbits of comets might be calculated. He again travelled in various countries, and at London made the acquaintance of Bayle. After his return to Basel in 1682 he tried experiments in physical and

mechanical science which attracted much attention. In 1687 he was appointed professor of mathematics in the university of Basel, and engaged in profound mathematical investigations, particularly in the development of the theory of the differential and integral calculus which had been devised by Leibnitz. In 1699 he was chosen member of the French academy, the first foreigner ever elected, and in 1701 became member of the Berlin academy. He directed that the logarithmic spiral, of which he had demonstrated the properties, should be engraved upon his tombstone with the motto: *Eâdem mutatâ resurgo.* After his death his treatise entitled *Ars Conjectandi* was published (1713). It was one of the earliest works on the theory of probabilities. His collected works were published at Geneva in 1744 (2 vols. 4to). **II. John,** brother of the preceding, born July 27, 1667, died Jan. 1, 1748. He was educated at the university of Basel, studied medicine, and in 1690 published a dissertation on effervescence and fermentation. But he soon turned his attention to mathematics. In 1690 he went to Geneva, and travelled in France, where he made the acquaintance of Malebranche, De l'Hôpital, and other men of science. He returned to Basel in 1692, and was appointed in 1695 professor of mathematics at Groningen. In 1696 he proposed for solution the following problem: "To find the curve on which a material point will fall from one given point to another in the least possible time." It was solved by his brother James and others, and James proposed in return another problem in regard to the solution of which there was a long controversy between the two brothers. John exhibited unreasonable jealousy of his brother, and was not equal to him as a mathematician. He, however, succeeded him as professor of mathematics at Basel, and remained in that position till his death. He was also jealous of his son Daniel, and had controversies with many of the scientific men of his day; but he was the instructor of Euler and the friend of Leibnitz, with whom he carried on a long correspondence, published at Lausanne and Geneva (2 vols., 1745). He aided with his brother in the development of the calculus, investigated many curious questions in physics, and contributed greatly to the advancement of mathematical science. He addressed many papers to the different scientific bodies of Europe, which were collected by Cramer (4 vols. 4to, Lausanne and Geneva, 1742), and was a member of the academies of Paris, Berlin, and St. Petersburg, of the royal society of London, and of the institute of Bologna. His works were published at Geneva in 1742 (1 vol. 4to). **III. Daniel,** second son of the preceding, born in Groningen, Feb. 9, 1700, died in Basel, March 17, 1782. He received instruction from his father in mathematics, and studied medicine for some years in Italy. While there he distinguished himself by a paper upon a question of geometry, and at the age of 24 was offered the presidency of an academy of sciences which had just been founded at Genoa. The following year he was appointed professor of mathematics at St. Petersburg, where he remained till 1733, when he was appointed first professor of botany and anatomy, and afterward of natural philosophy and metaphysics, in the university of Basel. In 1748 he succeeded his father as member of the academy of sciences at Paris, and ten times obtained the prizes of that body. He made many new and ingenious applications of mathematical science in mechanics, astronomy, and hydraulics, and in 1760 wrote a paper on inoculation in which he introduced a new principle into the theory of probabilities. He resigned his professorship in 1777, suffered much from asthma during the latter part of his life, and was finally found one morning by his servant dead in his bed. Among his works are: *Exercitationes quædam Mathematices* (4to, Venice, 1724); *Hydronamica, seu de Viribus et Motibus Fluidorum* (4to, Strasburg, 1738); and a work on the physical cause of the inclination of the axes and orbits of planets with reference to the solar equator. **IV. Nicholas,** elder brother of the preceding, born in Basel, Jan. 27, 1695, died in St. Petersburg, July 26, 1726. He travelled in France and Italy, and was then appointed professor at St. Petersburg with his brother. **V. John,** brother of the preceding, born in Basel, May 18, 1710, died July 17, 1790. He studied law and mathematics, in 1743 was appointed professor of eloquence at Basel, and in 1748 succeeded his father as professor of mathematics there. He was a member of the academy of sciences of Berlin and of Paris, and received three prizes from the French academy. **VI. John,** son of the preceding, born in Basel, Nov. 4, 1744, died July 13, 1807. He studied at Basel and Neufchâtel, devoting himself especially to astronomy, mathematics, and philosophy. At the age of 19 he was appointed astronomer of the Berlin academy, and afterward director of the mathematical class. He published *Recueil pour les astronomes* (3 vols., Berlin, 1772–'6), *Lettres astronomiques* (1781), and 6 vols. of his own travels, besides a collection of travels in 15 vols. **VII. James,** brother of the preceding, born in Basel, Oct. 17, 1759, died in St. Petersburg, July 13, 1789. When his uncle Daniel became infirm, he assumed at the age of 21 his duties as professor of natural philosophy, but was not chosen his successor, the appointment being made by lot. At the age of 29 he was appointed professor of mathematics in St. Petersburg, and married there a granddaughter of Euler. Two months afterward he died of apoplexy while bathing in the Neva. **VIII. Nicholas,** nephew of the first James and John, born in Basel, Oct. 10, 1687, died Nov. 29, 1759. He edited the *Ars Conjectandi* of his uncle James, and solved several of the geometrical problems proposed by his uncle John. He was professor of mathematics at Padua from 1716 to 1722,

in the chair once filled by Galileo, and was afterward professor first of logic and then of law at Basel. He was a member of the Berlin academy, of the royal society of London, and of the institute of Bologna. **IX. Jerome,** of the same family, born in Basel in 1745, died in 1829. He was distinguished as a naturalist and a mineralogist, and was for a time president of the council of his native canton. **X. Christopher,** a technologist, of the same family, born in Basel, March 15, 1782, died there, Feb. 6, 1863. He studied at Neufchâtel and afterward at Göttingen, where he devoted himself chiefly to the natural sciences. In 1802 he became professor at Halle, where he remained two years. He then spent some time in travelling, and in 1806 opened a private school at Basel, which he gave up in 1817 and became professor of natural history in the university, retiring in 1861. He published a number of works upon subjects connected with rational technology, among which are: *Ueber den nachtheiligen Einfluss der Zunftverfassung auf die Industrie* (Basel, 1822); *Handbuch der Technologie* (2 vols., 1833–'4; 2d ed., 1840); *Handbuch der industriellen Physik, Mechanik und Hydraulik* (2 vols., Stuttgart, 1834–'5).

BERNSTORFF. I. Johann Hartwig Ernst, count, a Danish statesman, born in Hanover, May 13, 1712, died in Hamburg, Feb. 19, 1772. He was educated in Germany, represented the Danish government in 1737 at the diet of Ratisbon, and in 1744 was appointed minister to Paris. In 1750 he became secretary and councillor of state, and in 1751 member of the privy council, with the portfolio of foreign affairs. A war with Russia on the Holstein-Gottorp question was averted by his prudence, and he was ennobled by Christian VII. (1767), and called by Frederick the Great the "oracle of Denmark." He promoted industry, art, and letters, and liberated his serfs. After having been ousted from office by Struensee in 1770, he was recalled in 1772 in the most flattering manner after the latter's downfall, and died when about returning to Copenhagen from Hamburg, where he had lived in the interval. **II. Andreas Peter,** count, a Danish statesman, cousin of the preceding, born at Gartow, near Lüneburg, Aug. 28, 1735, died in Copenhagen, June 21, 1797. He studied at German universities, travelled extensively, entered the Danish service in 1755, became a privy councillor in 1769, and in 1772 minister of foreign affairs. He reëstablished friendly relations with Great Britain, and in 1778 was the first to propose armed neutrality to Sweden. His views conflicting with those of the dowager queen Juliana and other influential parties, he left office in 1780. After the death of his first wife in 1782, he married in 1783 her sister the countess Augusta Stolberg, whose brothers were the famous German poets. Rejoining the cabinet in 1784, he prepared for the abolition of serfdom in Schleswig and Holstein; and by removing all trammels from liberty of the press, he enabled German thinkers to express ideas in Denmark which they were not permitted to utter in their own country. See Eggers, *Denkwürdigkeiten aus dem Leben des Staatsministers von Bernstorff* (Copenhagen, 1800).

BERŒA. I. An ancient town of Macedonia, on a tributary of the Haliacmon, in which St. Paul preached the gospel. (See Veria.) **II.** One of the ancient names of Aleppo.

BEROSUS, a priest of Belus at Babylon, who probably lived about 250 B. C., although some place him 30 and even 70 years earlier. He wrote in Greek a history of Chaldea or Babylonia, professing to derive the materials from the archives of the temple. It embraced the myths and traditions of the early ages, a description of Babylonia, and a chronological list of its kings down to Cyrus. He starts with a mythical period of 34,080 years, during which there were 86 kings, two of whom reigned more than 2,000 years each. His earliest historical date is placed by Rawlinson about 2458 B. C., and he speaks of 132 kings who reigned between that time and 538 B. C. His work itself is lost, there being extant only fragments preserved in citations by Josephus, Eusebius, Polyhistor, Syncellus, and some of the Greek fathers. The historical chronology of Berosus is to a degree confirmed by the inscriptions which have been discovered in Babylonia and Assyria, and, as far as they touch upon each other, by the Hebrew records. It is generally accepted as tolerably authentic by scholars, who discredit the statements of Ctesias. The existing fragments of Berosus, with the inscriptions, fill a space otherwise vacant in ancient history. They were partially collected by Scaliger in *De Emendatione Temporum* (Leyden, 1583), and more fully by Fabricius in the *Bibliotheca Græca* (Hamburg, 3d ed., 1718–'28); the best collection is by Richter, *Berosi Chaldæorum Historiæ que supersunt* (Leipsic, 1825; Paris, 1848). A work ascribed to Berosus, *Antiquitatum libri quinque, cum Commentariis Joannis Annii*, which appeared at Rome in 1498, and has been several times reprinted, is spurious, being a forgery by Annius of Viterbo.

BERQUIN, Arnaud, a French author, born in Bordeaux in 1749, died in Paris, Dec. 21, 1791. His idyls and ballads, and especially *Geneviève de Brabant*, became very popular, and still more his numerous writings for children, including brief stories and plays. His principal work of the kind, *L'Ami des enfants* (24 vols. 12mo, 1782–'3), obtained a prize from the French academy in 1784, and has been translated into German. Many of the stories were taken from Christian Felix Weisse's *Kinderfreund* (1776–'82), but adapted so admirably to the French as to convey an impression of their originality. He also published a free translation of Mrs. Trimmer's "Easy Introduction to the Knowledge of Nature," wrote novels, edited for some time the *Moniteur*, and, in conjunction with other journalists, *La feuille villageoise*. Complete editions of his writings

appeared in 1796–1803, and the last in 4 vols. large 8vo, 1836.

BERRIEN. **I.** A S. county of Georgia, bounded E. by the Alapaha river, which crosses the N. E. corner, and W. by Little river, and drained also by the Withlacoochee; area, 750 sq. m.; pop. in 1870, 4,518, of whom 460 were colored. In 1870 it produced 76,976 bushels of Indian corn, 41,184 of oats, 55,875 of sweet potatoes, 671 bales of cotton, 19,016 lbs. of wool, and 119,462 of rice. There were 636 horses, 3,682 milch cows, 6,951 other cattle, 7,016 sheep, and 13,529 swine. Capital, Nashville. **II.** A S.W. county of Michigan, bordering on Indiana and Lake Michigan; area, 600 sq. m.; pop. in 1870, 35,104. It is drained by the St. Joseph's, Pawpaw, and Galien rivers. The surface is undulating, and the soil near the St. Joseph's consists of a deep, black, sandy loam, overgrown with thick forests of hard timber. The Michigan Central and the Chicago and Michigan Lake Shore railroads pass through the county. The chief productions in 1870 were 450,809 bushels of wheat, 469,705 of Indian corn, 178,217 of oats, 282,503 of potatoes, 27,054 tons of hay, 90,769 lbs. of wool, and 548,959 of butter. There were 6,448 horses, 5,967 milch cows, 7,004 other cattle, 26,118 sheep, and 16,525 swine. Capital, Berrien Springs, on the St. Joseph's, 8 m. N. W. of Niles, the largest town.

BERRIEN, John Macpherson, an American lawyer and statesman, born in New Jersey, Aug. 23, 1781, died in Savannah, Ga., Jan. 1, 1856. He was the son of an officer in the war of the revolution, and early acquired distinction as a lawyer in Georgia. He was solicitor of the eastern district of Georgia in 1809, and judge of the same district from 1810 to 1822, when he became a member of the Georgia senate, from which he was transferred in 1824 to the senate of the United States, where he established a high reputation as an orator and statesman. He was appointed attorney general of the United States in 1829, but resigned that office in 1831 when Gen. Jackson's cabinet became inharmonious. In 1840 he was elected again to the national senate as a whig, and was reëlected in 1846, finally retiring in 1852.

BERRY, or **Berri,** a former province of France, nearly in the centre, now forming the departments of Indre and Cher, and small portions of those of Loire-et-Cher and Creuse. Capital, Bourges. It included most of the ancient territory of the Bituriges, the chief people of Celtic Gaul, was under Roman rule till near the end of the 5th century, and was wrested by Clovis in 507 from the Visigoths, who had invaded it, after which the local rulers were military chiefs or counts. Under Charles the Bald the province became a hereditary county, and was ruled by the counts of Bourges until about 1100, when the last of them, Arpin, sold the fief to Philip I. It remained thenceforward in possession of princes and princesses of the royal blood, first as a county, and after 1360 as a duchy, till 1601, when on the death of the widow of Henry III. it was definitively merged in the French crown. Since then the nominal title of duke of Berry has been given to a grandson of Louis XIV., to Louis XVI. while he was dauphin, and to Charles Ferdinand, son of Charles X. Berry suffered much during the wars with England and the religious wars. See *Histoire du Berry*, by Raynal (Paris, 1844–'7).

BERRY, or **Berri.** **I. Marie Louise Élisabeth,** duchess of, born Aug. 20, 1695, died at Marly, July 21, 1719. She was a daughter of Philippe d'Orléans, afterward regent of France, and married in 1710 Charles, duke of Berry, grandson of Louis XIV., after whose suspiciously sudden death in 1714 she secretly married one of her many lovers, made no longer a secret of her incest with her own father, and died from an illness which she contracted while giving to him a great entertainment, though barely recovered from her confinement, which she had attempted to conceal. St. Simon describes her as an ambitious Messalina, and she was so depraved that she was even accused of many crimes of which she was probably innocent. **II. Charles Ferdinand,** duke of, the second son of the count d'Artois, afterward Charles X., born in Versailles, Jan. 24, 1778, died in Paris, Feb. 14, 1820. He emigrated with his father in 1789, and served in the army of Condé till 1798, when he went to Russia, and in 1801 to England, where he contracted a secret marriage (which was afterward cancelled) with an English woman, who bore him two children. He was favorably received in France on landing at Cherbourg in 1814, afterward accompanied Louis XVIII. to Ghent, and made Paris his home after the final overthrow of Napoleon. He was stabbed by a saddler named Louvel, a political fanatic, on leaving the opera with his wife, and died next morning, after having in vain solicited the pardon of his murderer, who was foiled in his avowed purpose of extinguishing the race of the Bourbons by the birth seven months afterward of the duke of Bordeaux. (See Bourbon.) **III. Marie Caroline Ferdinande Louise,** duchess of, wife of the preceding, born in Palermo, Nov. 5, 1798, died near Gratz, April 7, 1870. She was a daughter of Francis I., king of the Two Sicilies, and of Maria Clementina, archduchess of Austria. Louis XVIII. arranged her marriage with his nephew the duke of Berry, which was celebrated in Paris on June 18, 1816. In 1819 she gave birth to a daughter, Louise Marie Thérèse, who became duchess of Parma, and died in 1864. After the assassination of her husband (Feb. 13, 1820), she gave birth (Sept. 29) to Henri, duke of Bordeaux, afterward known as the count de Chambord. She became very popular in Paris by her affable manners, and especially by her fondness for theatres and brilliant sociable entertainments. On the outbreak of the revolution of 1830 she was restrained by Charles X. from insisting upon the claims of her son to the throne, and she followed the Bourbon family

into exile. In 1831 she went to Sestri, but at the request of the king of Sardinia left his territory and proceeded to Modena and thence to Rome. She afterward went to Massa, where she engaged in a conspiracy for the restoration of the elder Bourbon line in the person of her son. At Massa she is said to have first met the count Ettore de Lucchesi-Palli, a Neapolitan diplomatist, with whom she contracted a secret morganatic marriage. In April, 1832, she effected a landing near Marseilles, and on the failure of the legitimist attempt in that city, she succeeded in reaching La Vendée in disguise with a few attendants. The attempted rising there having ended disastrously, she barely escaped to Nantes (June 9), where she found an asylum which was disclosed to M. Thiers by Simon Deutz, a converted Jew, who had gained her confidence at Rome. She was arrested on Nov. 6, after having concealed herself for 24 hours behind a chimney at the risk of suffocation. From Nantes she was sent as a prisoner of state to the citadel of Blaye. The alleged illegality of these summary proceedings created some public excitement, which was increased by the reports of her advanced state of pregnancy. The commander of the citadel, Col. Chousserie, resigning on account of the private instructions which he had received from the government in respect to her treatment, he was succeeded by Gen. Bugeaud, who made her publicly avow her secret marriage. She gave birth to a daughter, May 10, 1833, and was released on June 8 and conveyed to Palermo. She visited Charles X. at Görz, but was not favorably received, and the education of the duke of Bordeaux was intrusted to other hands. She subsequently resided in Venice, and after 1864 at her château of Brunsee, near Gratz, where she attended to the education of her four surviving children by her second husband, who inherited the title of Duke della Grazia and died April 1, 1864. The fine picture gallery of the duchess was sold by public auction in Paris in 1865.

BERRY, Mary, an English writer, born in Yorkshire in 1762, died in London, Nov. 20, 1852. She and her elder sister AGNES (who had much artistic talent, and died in May, 1851) became acquainted in 1787 with Horace Walpole, who called them his two little wives. Mary vindicated him in the "Edinburgh Review" against the criticisms of Macaulay, and she, her sister, and their father, a gentleman of wealth, were his literary executors, and in 1797 published an edition of his works in 5 vols. Mary Berry published her own works, "England and France," "Life of Rachel, Lady Russell," and a comedy entitled "Fashionable Friends," in 2 vols. in 1844. Lady Theresa Lewis edited in 1866 "Life and Correspondence of Miss Mary Berry."

BERRYER, Antoine Pierre, a French advocate and statesman, born in Paris, Jan. 4, 1790, died at his country seat near Angerville, Nov. 29, 1868. His ancestors were from Lorraine, and their original name was Mittelberger. He was one of three sons of Pierre Nicolas Berryer, an eminent lawyer. He was educated for the church in the school of the Oratorians at Juilly; but his father induced him to become a lawyer, and after serving for a time in an attorney's office, he made his début at the Paris bar early in 1811. In the same year he married Mlle. Gautier, the daughter of a Paris official. In 1814 he proclaimed at Rennes the deposition of Napoleon, and hoisted the legitimist flag, to which he remained faithful till his death, though he was a man of liberal ideas and a decided opponent of all arbitrary measures. He assisted his father in conducting the defence of Ney, and obtained the acquittal of Cambronne and the pardon of Debelle. His practice now increased steadily. His imposing presence enhanced the effect of his oratory, and his eloquence has been described as almost equal in power to that of Mirabeau. In 1826 he defended Lamennais against a charge of atheism. Elected to the chambers in 1830 by a large majority, his first great speech was a denunciation of the unconstitutional character of the famous address of the 221. The July revolution did not interrupt his parliamentary career, though he continued to be the champion of the legitimists. He took the oath of allegiance to Louis Philippe's government, but never ceased to embarrass it. In 1832 he was arrested as an accomplice of the duchess of Berry; but it was shown that he had endeavored to stop her expedition, and the charge was abandoned. He defended Chateaubriand from a similar charge, and exerted himself in vain for the liberation of the duchess. His political career interfering with his professional labors, he was involved in pecuniary difficulties, and a public subscription of 400,000 francs was raised for him in 1836. In the chambers his renown was increased by his powerful speeches in opposition to the press laws of September, 1835, the measure against associations, and the Pritchard indemnity bill (1845); but he was censured for having paid homage to the count de Chambord in London (1843). In 1840 he was one of the counsel for the defence of Louis Napoleon after the Boulogne expedition. On the revolution of 1848 he became the chief of the legitimist faction which was opposed to universal suffrage, adhering to the cause of the count de Chambord and the doctrine of divine right. On the morning after Louis Napoleon's *coup d'état* (Dec. 2, 1851) he appeared at the mairie of the 10th arrondissement of Paris, and voted in favor of the deposition of the prince-president. In 1852 he was elected to the academy of sciences. In 1858 he defended Montalembert in a celebrated speech, and subsequently he was counsel for the Patterson-Bonapartes in the great suit for the recognition of the Baltimore marriage. He kept aloof from politics till 1863, when he was reëlected to the chambers with Thiers. He took sides with the federal

government during the civil war in the United States, denounced the invasion of Mexico, and affirmed the authority of the French courts to fine and imprison all who were concerned in the construction of confederate cruisers in France. His opinion exerted some influence in preventing the emperor from taking the responsibility of letting the steamers be delivered to the confederates, and his last professional argument was as leading counsel in the suit instituted against Arman, the principal contractor for confederate vessels. The semi-centennial anniversary of his practice at the bar was celebrated in France in 1863, and a great ovation was given to him in England in 1864, Sir Roundell Palmer presiding on the occasion. He spoke in 1867 in favor of French intervention in Rome, and in 1868 addressed from his deathbed a letter to the editor of the *Électeur* justifying Baudin's proceedings in 1851. See *Œuvres de Berryer* (2 vols., Paris, 1872 *et seq.*), the first volume containing his parliamentary speeches, with a notice by De Noailles.

BERSERKERS (Norse, *ber*, bare, and *serkr*, coat of mail), giants and warriors of Scandinavian mythology, and especially the descendants of Stoerkodder, a hero of immense size and great valor, who fought without coat of mail, and whose exploits have been celebrated in the sagas. The name Berserkers was also applied to Scandinavian warriors who were liable to fits of frenzy, arising from the use of intoxicating liquors or from an excited imagination. During these fits they performed extraordinary feats and attacked indiscriminately friends and foes.

BERTHELOT, Pierre Eugène Marcellin, a French chemist, born in Paris, Oct. 25, 1827. He was an assistant of Balard in the collége de France, and afterward professor of organic chemistry in the school of pharmacy; and in 1864 a chair of organic chemistry in the collége de France was created for him. M. Berthelot was especially instructed to advance his own ideas and treat at length of his own discoveries in his lectures. In 1854 he introduced the theory of polyatomic alcohols. This theory conducted him to the synthesis of natural fatty bodies, and thereby to a knowledge of their true constitution. By it he defined also the constitution of the sugars, and was able to understand that also of the fixed principles of vegetable tissues, although he has not yet produced these latter by synthesis. He has published *La chimie organique fondu sur la synthèse* (1860) and *Leçons sur les méthodes générales de synthèse en chimie organique* (1864). Perhaps his most celebrated researches are those connected with the discovery of acetylene and the synthesis of alcohol. His chief glory is that by his own experiments he has successfully overthrown the famous dogma of Berzelius and Gerhardt, "that chemical forces alone are not able to effect organic synthesis, and that when such metamorphoses occur they are due to the agency of vital force."

BERTHELSDORF, a village of Saxony, about 1 m. from Herrnhut; pop. about 2,000. The central conference of the Moravians is held here in the castle formerly inhabited by Count Zinzendorf.

BERTHIER, a county of Canada, in the province of Quebec, bounded S. E. by the St. Lawrence, just above Lake St. Peter; area, about 1,900 sq. m.; pop. in 1871, 19,804. It is about 10 m. wide, and runs in a N. W. direction to the undetermined northern frontier of the province, a distance that may be estimated at 190 m. It is drained by Maskinonge lake and river, Assumption river, and other streams and ponds. Chief town, Berthier, on the St. Lawrence, 46 m. N. N. E. of Montreal.

BERTHIER, Jean Ferdinand, a French deaf mute, born near Mâcon about 1805. He attended the national institution for deaf mutes at Paris, was while still young appointed an instructor there, and is now (1873) the dean of the institution, and one of the most eminent teachers of the deaf and dumb in Europe. He has greatly contributed to diffuse the methods of the abbé de l'Épée and of the abbé Sicard. Among his principal works is *L'Abbé de l'Épée, sa vie, son apostolat, ses travaux, sa lutte et ses procès* (Paris, 1852).

BERTHIER, Louis Alexandre, prince and duke of Neufchâtel and Valengin, and prince of Wagram, a French soldier, born in Versailles, Nov. 20, 1753, died in Bamberg, June 1, 1815. His father was chief of the corps of topographical engineers. After studying in the topographical bureau he became lieutenant in the general staff and afterward captain of dragoons, and served in the American war under Lafayette. As general of the national guard of Versailles he rendered good service to the royal family in October, 1789. Afterward he was chief of the general staff, under Lafayette, Luckner, and Custine. He participated in the unsuccessful defence of Saumur in June, 1793. After the 9th Thermidor he was appointed chief of the general staff of Kellermann, and by causing the French army to take up the lines of Borghetti contributed to arrest the advance of the enemy. He also proved himself a good general of division in the battles of 1796–'7 in Italy, and excelled as a staff officer by his grasp of all the details of the service, though he had not the genius required for supreme command. Despite his remonstrances, Bonaparte placed him in 1798 at the head of the army of occupation in Rome; but he resigned his command to Masséna, and went to Milan, where he fell in love with the beautiful Madame Visconti, his eccentric and lasting passion for whom caused him during the expedition to Egypt to be nicknamed the chief of the *faction des amoureux*, and absorbed the greater part of the vast sums bestowed upon him by his master. After his return from Egypt he seconded Bonaparte on the 18th and 19th Brumaire, and was minister of war till April 2, 1800. He was chief of the general staff at the battle of Ma-

rengo, concluded an armistice with Gen. Melas, was employed on several diplomatic missions, and reinstated in the war ministry till the proclamation of the empire. With the title of major general of the grand army, he accompanied the emperor as chief of the general staff during all his subsequent campaigns. On Oct. 17, 1805, he negotiated with Mack the terms of the capitulation of Ulm. After the Prussian campaign of 1806 he was made sovereign prince of Neufchâtel and Valengin. In 1808 he was ordered to marry the princess Elizabeth Maria of Bavaria-Birkenfeld, the king of Bavaria's niece, and was made marshal and vice constable of France. In 1809 Napoleon placed him as general-in-chief at the head of the grand army destined to operate from Bavaria against Austria. He won no glory in this capacity, but again distinguished himself in the battle of Wagram, which procured him one of his princely titles. He failed, however, completely during the Russian campaign. After the senate had decreed the deposition of the emperor, Berthier was one of the first to pay court to Louis XVIII., who made him a peer and captain of the royal guard. During the hundred days he wished to remain neutral, concealed from the king a letter he had received from Napoleon announcing his purpose to leave Elba, and retired to Bamberg, where, according to some, he was thrown from a window of his father-in-law's palace by six men in masks, supposed to have been agents of a secret society; but, according to a more probable account, he threw himself from the balcony at the sight of Russian troops marching toward France. He wrote *Relation des campagnes du général Bonaparte en Égypte et en Syrie* (Paris, 1800), and *Relation de la bataille de Marengo* (1806); and his memoirs were published in 1826.—His only son, Napoléon Louis Joseph Alexandre Charles, duke and prince of Wagram, born in Paris, Sept. 11, 1810, became a senator in 1852, and has greatly improved agriculture in his vast domain of Grosbois. He married a daughter of Count Clary and cousin of the dowager queen of Sweden, and is the father-in-law of Prince Joachim Murat.

BERTHOLD OF RATISBON, a German preacher of the middle ages, born in that city about 1215, died there in 1272. He was a Franciscan friar, and preached for many years to immense outdoor congregations in Germany, Switzerland, and Hungary. The first complete edition of his original sermons, which were singularly eloquent, was published in 1862 by Franz Pfeiffer (2 vols., Vienna), and they have been translated into modern German by Göbel, with a preface by A. Stolz. According to Laband's *Beiträge zur Geschichte des Schwabenspiegels* (Berlin, 1861), the sermons serve also to explain this compilation of Swabian laws.

BERTHOLLET, Claude Louis, a French chemist, born at Talloire, near Annecy, in Savoy, Nov. 9, 1748, died at Arcueil, near Paris, Nov. 6, 1822. He took his medical degree at the university of Turin, and in 1772 went to Paris, was appointed physician to the duke of Orleans, and applied himself to chemistry. He soon became known by his "Essays" on this branch of science, and in 1780 was elected a member of the academy of sciences. Some years later the duke of Orleans procured for him the office of government commissary and superintendent of dyeing processes, a position previously held by Macquer. To this appointment chemistry is indebted for his work on the theory and practice of the art of dyeing, which is much superior to anything of the kind ever published before. In 1785 Berthollet, at a meeting of the academy of sciences, announced his belief in the antiphlogistic doctrines propounded by Lavoisier, in opposition to the phlogistic theory then in vogue, and he was the first French chemist of celebrity who did so. He differed from Lavoisier, however, on one point: not admitting oxygen to be the acidifying principle, he cited sulphuretted hydrogen as a compound possessing the properties of an acid; and the justness of Berthollet's views has been confirmed by the discovery of other acids into the composition of which oxygen does not enter. During the same year he discovered the composition of ammonia, and published his first essay on dephlogisticated marine acid, now called chlorine, proposing the use of it in the process of bleaching. During the revolutionary war, while the ports of France were blockaded, he visited almost every part of the country for the purpose of pointing out the means of obtaining saltpetre, and was engaged with others in teaching the processes of smelting iron and converting it into steel. In 1792 he was appointed one of the commissioners of the mint, and in 1794 a member of the commission of agriculture and arts, and professor of chemistry at the polytechnic and normal schools. In 1795 he became a member of the newly organized institute of France, and in the following year he was appointed by the directory to proceed to Italy with Monge, to select works of art and science for the French capital. On this occasion he became acquainted with Bonaparte, and was led to join the expedition to Egypt, where he took part in the formation of the institute of Cairo. Berthollet coöperated with Lavoisier, Guyton de Morveau, and Fourcroy in establishing a new and more philosophical system of chemical nomenclature. He was the author of more than 80 scientific papers, some of which were inserted in the memoirs of the academy, and others were printed in the *Annales de chimie*, *Journal de physique*, and the *Mémoires de physique et de chimie de la société d'Arcueil*, so called from the place where Berthollet lived, the meetings of the society being held at his house. In some of the first memoirs published by Berthollet on sulphuric acid, on the volatile alkali, and the decomposition of nitre, he adopted the phlogistic theory; but subsequently, in a paper on soaps, he showed that they are chemical

compounds, in which the oil, by combining with the alkali, acts the part of an acid. Berthollet was the discoverer of the ammoniuret of silver, commonly called fulminating silver. He also first obtained hydrate of potash in a state of purity, by dissolving it in alcohol. In 1803 he published his *Essai de statique chimique*, in which he attempts to confute the opinion of Bergman with regard to the nature of chemical affinity. Sir Humphry Davy, in his "Elements of Chemical Philosophy," gives a synopsis of the views of Berthollet on this point, and shows them to be incorrect. In a controversy with Proust, Berthollet maintained that inorganic bodies are capable of combining in all proportions; but the views of Proust have been since corroborated by the doctrine of definite proportions.—On his return from Egypt, Berthollet was made a senator, and afterward grand officer of the legion of honor and grand cross of the "order of reunion." He was created count by Napoleon, and after the restoration of the Bourbons he was made a peer of France. These distinctions did not affect his studious and simple mode of life; and being obliged to adopt armorial bearings, he selected the figure of his dog. Berthollet studied the antiseptic properties of charcoal, and by his advice Admiral Krusenstern preserved water fresh by placing it in charred barrels during a long voyage. He first showed how to reduce the complicated combinations of animal and vegetable substances by combustion in one of his last memoirs, entitled *Considérations sur l'analyse végétale et l'analyse animale* (1817).—His only son, Amédée, born in 1783, died in Marseilles in 1811. He assisted his father in the second edition of the *Éléments de l'art de la teinture, avec un description du blanchîment par l'acide muriatique oxigéné* (2 vols. 8vo, Paris, 2d ed., 1804), and was a member of the society founded by his father at Arcueil. He distinguished himself as a chemist, and established a manufactory of carbonate of soda according to his father's process; but competition preventing his success, he fell into dissipated courses, and committed suicide by suffocation with charcoal gas, seating himself at a table with a watch and writing materials before him, and carefully noting his sensations as long as he could hold the pen.

BERTIE, a county of North Carolina, at the western extremity of Albemarle sound, bounded E. by the Chowan and W. and S. by the Roanoke river, and drained by the Cashie; area, 900 sq. m.; pop. in 1870, 12,950, of whom 7,437 were colored. The surface is flat and the soil fertile. The chief productions in 1870 were 300,314 bushels of Indian corn, 54,999 of sweet potatoes, and 5,055 bales of cotton. There were 1,063 horses, 2,454 milch cows, 4,924 other cattle, 3,453 sheep, and 14,100 swine. Capital, Windsor.

BERTIN, Louis François, a French journalist, born in Paris, Dec. 14, 1766, died there, Sept. 13, 1841. The revolution diverting him from the priesthood, he engaged in journalism, opposing the excesses of the Jacobins. In January, 1800, he founded the *Journal des Débats*, which under his direction and that of his relatives, and through the collaboration of Chateaubriand, Madame de Staël, Royer-Collard, and other celebrated writers, ultimately became the most influential journal in France. Although it professed to be exclusively literary and artistic, historical and political allusions were occasionally introduced which the authorities construed as royalistic. Napoleon had the editor arrested in the first year, and after nine months' imprisonment banished to Elba; and it was only after several years that he was allowed to resume the control of the paper, and on condition of his paying annually 24,000 francs to the censor, calling his publication the *Journal de l'Empire*, and submitting to the control of the emperor's agents. It was suppressed nevertheless in 1811, and Bertin again banished to Elba, whence the next year he escaped to Italy. In 1814 the publication was resumed under the original title. Bertin followed Louis XVIII. to Ghent, but opposed him after his rupture with Chateaubriand, on which occasion these words appeared in the *Débats: Malheureuse France, malheureux roi.* For this he was prosecuted, but acquitted on appeal. After the July revolution the paper became very prosperous, Bertin invariably declining public office, though generously supporting the claims of his collaborators. He has been called the chief of the Bertin dynasty. He wrote several novels, partly after English originals, and possessed exquisite powers of literary appreciation; but his fame rests on his eminent services to French journalism.—He was succeeded as editor-in-chief by his son Louis Marie Armand, born in Paris, Aug. 22, 1801. He was secretary of legation in London under Chateaubriand, and did much to enlist the best talent for the *Débats*, though he personally wrote little. On his death, Jan. 12, 1854, the direction of the journal devolved upon his brother Édouard François, born in Paris in 1797. He was inspector of fine arts under Louis Philippe, and is an esteemed landscape painter. As editor of the *Débats* he has supported the cause of Italy and of the United States, and displayed great tact in making the paper popular among all classes. His sister Louise Angélique, born Jan. 15, 1805, composed several operas, including *Faust* (1831) and *Esmeralda* (1836), the latter founded on Victor Hugo's *Notre-Dame de Paris.* In 1842 she published *Les glanes*, a volume of poetry, to which the academy awarded a prize.

BERTINI, Henri, a pianist and composer, born in London of French parentage, Oct. 28, 1798. His father and his brother were both skilful musicians, and young Bertini received from them a thorough training for his profession, being taught in the system of Clementi. At the age of 12 he made a successful concert tour through Holland and Germany, subsequently performed in Scotland and England, and then went to

Paris, where he applied himself especially to the study of harmony and composition. He ultimately established himself in Grenoble. The number of his published works reaches nearly 200. They consist mainly of rondos, caprices, fantasias, nocturnes, and other compositions for the piano; but he has also composed a number of pieces for the piano in connection with stringed and reed instruments, comprising trios, quartets, sextets, and one nonet. He also prepared 12 sets of studies, which were written with much skill and a complete knowledge of what was necessary to form a correct progressive school for the pianoforte.

BERTRAND DE BORN. See BORN.

BERTRAND, Henri Gratien, count, a French soldier, born at Châteauroux, March 28, 1773, died there, Jan. 31, 1844. He early joined the corps of engineers, became a captain in 1795, and, after serving in the Italian and Egyptian campaigns, was made general of brigade. He distinguished himself at Austerlitz, became adjutant of the emperor and general of division, and after the battle of Aspern, where he restored the passage over the Danube, he was made count and governor of Illyria. He covered with his reserve corps the retreat of the army after the battle of Leipsic, and the passage over the Rhine after that of Hanau. To his previous rank of grand marshal of the palace the emperor added on his return to Paris that of aide major general of the national guard. He followed Napoleon to Elba, and with Soult is said to have prevented the emperor from rushing into death at Waterloo. Bertrand and his wife (a daughter of Gen. Arthur Dillon) shared the exile at St. Helena. His sons published the *Campagnes d'Égypte et de Syrie, dictées par Napoléon, à Sainte-Hélène, au général Bertrand* (2 vols., Paris, 1847), which he wrote under Napoleon's dictation. Returning to Paris after Napoleon's death, the sentence of death previously passed upon him was cancelled, and he was restored to his rank. After the July revolution he was for a short time at the head of the polytechnic school, and was a deputy till 1834, advocating liberal measures and the freedom of the press. In 1840 he escorted Napoleon's remains from St. Helena to Paris, and he was buried by his side.—One of his sons, ALEXANDRE ARTHUR HENRI, born in 1811, acquired distinction as a soldier in Algeria and the Crimea, and as a deputy, and became in 1854 general of brigade.

BÉRULLE, Pierre de, a French prelate and statesman, born near Troyes, Feb. 4, 1575, died in Paris, Oct. 2, 1629. He was the founder of the order of Carmelite nuns and of the congregation of the Oratory in France. He brought about the first reconciliation between Louis XIII. and his mother, concluded as ambassador to Spain the peace of Monzon, obtained on a mission to the Roman see a dispensation for the marriage of Henrietta of France with the prince of Wales, and accompanied the princess to England. He afterward became minister of state, to the great displeasure of Richelieu, who soon made this position untenable for him, after which he returned to ecclesiastical avocations. Urban VIII. made him cardinal in 1627, but he declined the bishoprics offered to him by Henry IV. and Louis XIII., and remained content with the moderate benefice of two abbeys, joining as before his elevation in the humble practices of his order. He was also noted for his patronage of literature and science, and was among the first to appreciate Descartes. His works, chiefly sermons, passed through many editions during his life, and were collected by his disciples after his death (2 vols. fol., 1644, and 1 vol. fol., 1657).

BERWICK, James Fitz-James, duke of, an English and French soldier, born in 1670, killed at Philippsburg, June 12, 1734. He was an illegitimate son of James II. by Arabella Churchill, sister of the duke of Marlborough, and was raised to the peerage in 1687 as Baron Bosworth, earl of Tinmouth, and duke of Berwick-on-Tweed; but these titles became forfeited in 1695, when he was attainted. He accompanied his father to France, and in 1690 to Ireland, where he distinguished himself at the siege of Londonderry and the battle of the Boyne. He acquired reputation in the French service under Louis XIV., who in 1693 made him lieutenant general and in 1706 marshal. For his successful expedition in aid of Philip V. of Spain in 1704 he was made grandee by that king. Recalled to France, he fought the Camisards, and conquered Nice, but subsequently resumed the command in Spain, and in 1707 achieved over the combined English and Portuguese forces the brilliant and decisive victory of Almanza, for which Philip V. granted him the dignity of duke and the towns of Liria and Xerica. On his return to France he was placed at the head of the army on the Rhine, in 1719 commanded against Philip V. in Spain, and fell, after many gallant achievements, at the siege of Philippsburg. His first wife was the widow of the earl of Lucan and a daughter of the earl of Clanricarde, by whom he had issue James Francis, duke of Liria and Xerica, whose posterity perpetuate the senior branch of the Berwick family. His second wife, Anne Bulkeley, bore him several children, the eldest of whom inherited the title of duke de Fitz-James, that had been conferred upon him in France. The spurious *Mémoires du maréchal de Berwick* (2 vols., Hague, 1737–'8) were followed by the genuine *Mémoires*, published by the duke de Fitz-James and revised by the abbé Hook (2 vols., Paris, 1778).

BERWICK-ON-TWEED, an Anglo-Scotch border town and seaport, on the N. bank of the Tweed, near the German ocean, 58 m. by railway E. S. E. of Edinburgh; pop. of the town and parliamentary borough in 1871, 13,231. Geographically it forms part of Berwickshire, Scotland, but belongs to England, and is not legally included in any county, though

for convenience it is often reckoned as being in Northumberland. It extends with its liberties, including the suburbs Tweedmouth (an important railway station) and Spittal (a fishing village and watering place) 3½ m. along the coast and nearly 3½ m. westward. In ancient deeds the town is called South Berwick, to distinguish it from North Berwick on the frith of Forth, 34 m. N. E., near Tantallon castle. Berwick-on-Tweed is mostly built on the castle hill. The castle, prominent in the border wars, is now a shapeless ruin, with only a tower and part of the wall remaining. The new royal border bridge or aqueduct, connecting the North British with the Newcastle and Berwick railway, one of the celebrated works of Robert Stephenson, spans the Tweed from the castle hill to the Tweedmouth side. It was opened in 1850, is 134 ft. high, 2,000 ft. long, and has 28 semi-circular arches. There is also an old stone bridge. The town is well built, with spacious streets, but the general appearance is dilapidated. A thorough system of drainage has recently been introduced. There are many places of worship; the parish church was enlarged and embellished in 1855, and a fine new Gothic church opened in 1859. The guildhall belongs to the burgesses, and is a fine building with a tall spire. There are numerous schools (including a corporation academy) and charitable institutions, and the Berwickshire naturalists' club meets here. The corn exchange was opened in 1848, and a new cemetery in 1857. Once the chief seaport of Scotland, the town still retains much commercial importance. About 700 vessels, with a tonnage of over 40,000, enter and leave the port annually. The chief exports are salmon, coal, wool, ale, and whis-

Berwick-on-Tweed.

key; the chief imports, timber, staves, iron, tallow, and hemp. The town has a ship-building yard, breweries, an extensive iron foundery, and manufactories of steam engines and machinery, cotton hosiery, and carpets; and near it are coal mines.—The authentic history of Berwick begins with Alexander I. of Scotland in the 12th century. It was most prosperous in the 13th under Alexander III. Edward I. held the English parliament here which decided for Balliol and against Bruce for the throne of Scotland; and here the limbs of Wallace were exposed, after his execution. Berwick was prominent in the border wars, and was often taken and retaken by the Scotch and the English from early in the 14th till late in the 15th century, when it finally reverted to England. James I. granted to the citizens the seigniory of the town. This charter, somewhat modified by the municipal reform act, is still in force. The town is governed by a corporation of 6 aldermen and 18 councillors, one of whom is the mayor, and the borough returns two members of parliament.

BERWICKSHIRE, a maritime and border county forming the S. E. extremity of Scotland, on the German ocean, separated S. E. by the Tweed from Northumberland, England, and bounded N. by Haddingtonshire, W. by Edinburghshire, and S. by Roxburghshire; area, 472 sq. m.; pop. in 1871, 36,475. It is divided into the districts of Lammermoor, Lauderdale, and the Merse. Some of the famous Lammermoor hills are over 1,500 feet high. About 200,000 acres are under cultivation, and the production is steadily increasing from improved systems of culture. Though smaller than many other Scotch counties, it produces more wheat

and turnips than most of them. Sheep and cattle are raised in great numbers. The coast is rugged, with no bays save at Coldingham and Eyemouth. Excepting the Eye in the northeast, all the streams are tributaries of the Tweed and abound with fish. The salmon fisheries, long suspended, have lately resumed some of their former importance. The chief trade is carried on through Berwick-on-Tweed. The only royal burgh is Lauder; the largest town is Dunse; and the county town is Greenlaw, 3 m. S. of which is Hume castle, on a hill 900 feet high. There are numerous relics of Roman and British encampments, and among the many antiquities are those of Fast castle (the Wolf's Crag of the "Bride of Lammermoor"), 2 m. from the celebrated St. Abb's Head promontory, and the ruins of Coldingham priory and of Dryburgh abbey.

BERYL (Gr. *βήρυλλος*), a mineral composed of silica 66·8, alumina 19·1, glucina 14·1=100. The union of the emerald and beryl in one species, which Pliny says was suggested in his time, was first recognized on crystallographic grounds by De Lisle, and more satisfactorily through measurements of angles by Haüy, and chemically by Vauquelin. The beryl, emerald or smaragd, and aquamarine are all the same mineral species, and only distinguished from each other by their blue and yellow shades of green, or by the delicacy of the crystals. The beryl is sometimes also white. The emerald is more transparent and of finer colors than the beryl, and makes a handsomer gem. Aquamarine is a beautiful sea-green variety. The brilliant green color of the emerald is due to the presence of a minute quantity of oxide of chromium; beryl and aquamarine derive their colors from the oxide of iron. The beryl crystallizes in regular 6-sided prisms, which are often striated with longitudinal channels. Its hardness, rated at 7·5 to 8 on the mineralogical scale, is less than that of topaz and greater than that of quartz. Its specific gravity is 2·7. The crystals are found in metamorphic limestones, in slate, mica schist, gneiss, and granite rocks, generally as single crystals or in clusters, rather than in veins. There are many celebrated localities of gigantic beryls and beautiful emeralds in various parts of the world. Upper Egypt produced the mineral in ancient times, and it is still found in the mica slate of Mount Zabarah. Siberia, Hindostan, Limousin in France, Peru, and Colombia have all furnished splendid emeralds. The largest beryls known have been found in Acworth and Grafton, New Hampshire, and in Royalston, Massachusetts. One from Grafton measures 4 ft. 3 in. in length, 32 in. through in one direction and 22 in another transverse, and weighs 2,900 lbs. Another is estimated to weigh nearly 2½ tons, measuring 45 in. through in one direction and 24 in. in another. A crystal in the museum at Stockholm, found in Sweden, is considered to be the largest in Europe; it weighs 80 lbs. The value of the specimens is not at all dependent on their size. The large crystals are of coarse texture and feeble lustre, and possess no beauty. As the beryl expands by heat in a direction perpendicular to the principal axis, and contracts on the line of the axis, there is a point where the expansion and contraction exactly neutralize each other, and a section across this would maintain a constant length. Soleil recommends the cutting of prisms in conformity with this direction, to be used as normal units of measurement.

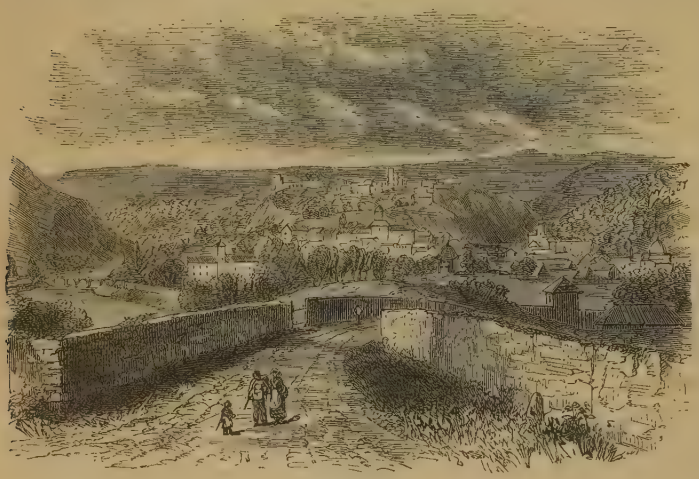
BERYTUS. See Beyrout.

BERZELIUS, Johan Jakob, baron, a Swedish chemist, born at Väfversunda, district of Linköping, Aug. 20, 1779, died in Stockholm, Aug. 7, 1848. His father was government schoolmaster in his native village, and was very poor. Berzelius received his early education at home, and in 1796, through the assistance of friends, commenced the study of medicine in the university of Upsal. The lectures at Upsal in those days were read without any experimental illustrations, and the instructions in the laboratory were of a superficial and unsatisfactory kind. He contrived, however, to obtain the means of making an analysis of a mineral water, and in 1800 published his first paper, entitled *Nova Analysis Aquarum Medeviensium*, which at once gained for him considerable local celebrity. In 1802 he became adjunct professor of medicine in Stockholm, at the same time practising his profession and delivering lectures on chemistry. At this period nearly all the scientific men of the world were attracted by Volta's discoveries to experiment with voltaic electricity, and Berzelius in 1803 published an important paper on the action of electric currents on solutions of salts, in which he first pointed out that combustible bodies, alkalies, and earths went to the negative pole, while oxygen and the acids went to the positive. Three years later Davy published similar views and extended his researches further than Berzelius, as he had far greater means at his command; in Davy's paper, however, no allusion is made to Berzelius, an omission which was at once supplied by the translators of Davy's article for the German and Swedish annals. In 1806 Berzelius was made teacher of chemistry at the military school of Carlberg, and in 1807 was appointed professor of medicine and pharmacy at the medical institute in Stockholm. At this time he constructed a battery consisting of zinc, copper, and two liquids so made that the zinc was not attacked by the liquid in which it was immersed, while the copper was rapidly oxidized. By aid of this apparatus and the employment of mercury at the negative pole, he succeeded early in 1808 in preparing the metals calcium, barium, and the supposed amalgam of ammonium. Simultaneously with his electrical researches he conducted the analysis of minerals, and in 1803, when he was only 23 years old, made the discovery of the metal cerium. While thus engaged it was necessary for him to

practise medicine for his support, and he even established a manufactory of artificial mineral waters in order to add to his scanty income. The variety of his occupations at this period of his life somewhat interfered with the systematic course of investigation which he subsequently adopted. The tendency of his researches was due to accident; the fashion of the day led him to pursue galvanism, his intimate association with Hisinger suggested mineralogy, and his avocation as a physician naturally brought in physiological chemistry. The discovery of the alkaline metals by Davy and his own success in the same direction prompted him to apply himself to the study of the elements, and then commenced the really great work of his life, which culminated in the promulgation of the law of chemical proportion. To prove the correctness of this law, Berzelius reëxamined all known chemical compounds and prepared many new ones. In the execution of this great work it was necessary for him to devise new methods of analysis and to invent all of the apparatus for their execution. He had to distil his alcohol from brandy, and the commonest reagents were prepared in his laboratory. He invented the lamp with double draft, since called the Berzelius lamp; he also introduced smaller quantities of substances which could be burned and weighed in platinum crucibles; funnels, beakers, wash bottles, Swedish filter paper, rubber and glass tubing, and a great variety of other aids were introduced by him; and he removed the laboratory from the dingy cellar to airy upper rooms, and elevated chemistry from a black art to an exact science. In 1818, after many years of patient industry, Berzelius was prepared to publish a list of 2,000 simple and compound bodies, giving their exact chemical composition. It was natural for him to apply the same methods of research to minerals that he did to artificial compounds, and he was early in the field with his famous mineral system founded upon chemistry. Mohs adopted crystalline form, hardness, and specific gravity as the basis of classification, and did not care for an elementary analysis. Berzelius thought this was much like a person groping in the dark refusing to accept more light for fear of seeing too much. As the only mineral analyses extant were by Bergman, Klaproth, and Vauquelin, it was necessary to repeat all of them before any system could be established; and it was not till 1847 that the last edition of Berzelius's "Mineral Chemistry" was published under Rammelsberg's revision. Under the instruction of his old friend Gahn of Fahlun, the pupil of Bergman and friend of Scheele, Berzelius acquired great skill in the use of the blowpipe, and published a book on the subject which for 30 years was the leading authority, until superseded by Plattner's more comprehensive work. As early as 1806, in conjunction with Hisinger, he commenced the "Memoirs relative to Physics, Chemistry, and Mineralogy," and his numerous contributions to those sciences, amounting in all to more than 200 papers, obtained for him that high rank which he holds as an accurate observer and experimental analyst. He was one of the chief founders of the medical society of Sweden, and in 1808 he became a member of the royal Swedish academy, of which he was chosen president in 1810. In the intervals of his public duties he paid several visits to Paris, and in 1812 he spent some time in London. In 1815 the king of Sweden named Berzelius a knight of the order of Vasa; and in 1818 he was appointed perpetual secretary of the Stockholm academy of sciences. On the coronation of the king in the same year, Berzelius was ennobled, and, contrary to the custom of the country, was allowed to retain his own name. In 1821 he was named commander of the order of Vasa, and France gave him the insignia of the legion of honor, and Austria those of the order of Leopold. His works are both numerous and important. He contributed to the "Physical Memoirs," during a period of 12 years, 47 original papers of great merit. His treatise on chemistry went through five large editions, and was partly rewritten each time. It is most complete and best known in the edition translated into French under his own inspection, by Esslinger, and published in 8 vols. at Brussels in 1835. The last volume contains his very remarkable dissertation on chemical apparatus, with essays on qualitative and quantitative analysis, and the use of the blowpipe. The 5th edition, begun in 1842, was carried through 5 vols., including one on organic chemistry, previous to his death in 1848. At the instigation of Berzelius the members of the academy of sciences of Stockholm consented to prepare yearly reports on the progress of all the sciences. Berzelius took upon himself the department of physics, chemistry, geology, and mineralogy; and his share of the labor has been of great use to the scientific world. The reports, begun in 1820, were continued to the time of his death, and since 1847 have been conducted by Liebig, Wöhler, and Kopp in Germany. We thus have a complete series of reports on the progress of chemistry since 1820. It is worthy of note that all the leading chemists of Germany, excepting Liebig, were pupils of Berzelius. Soon after his marriage in 1833, the directors of the Swedish iron works, in acknowledgment of the light his researches had thrown on their art, and of his services to the useful arts of his country, conferred on him a pension for life.

BERZSENYI, Dániel, a Hungarian poet, born at Hetye, May 7, 1776, died at Nikla, Feb. 24, 1836. A volume of his lyrics entitled *Versek* appeared in 1813, embracing the best specimens of that kind of poetry till then published in Magyar, among them the stirring national ode "To the Hungarians" (2d ed., 1816). He also wrote æsthetical and philosophical essays. In 1830 he became a member of the Hungarian academy. A complete collection of his works was published in Pesth in 1842.

BESANÇON (anc. *Vesontio*), a town of France, capital of the department of Doubs, on both sides of the river Doubs, and on the Rhône and Rhine canals, 198 m. S. E. of Paris; pop. in 1866, 46,961. It is strongly fortified, with a citadel built by Vauban, is the seat of an archbishop, and has a school of artillery, a library



Besançon.

of 80,000 volumes, academies of science and art, a seminary for priests, and a botanical garden. There are many hospitals and a deaf and dumb asylum. Among the prominent buildings are the prefecture and the ancient palace of Cardinal Granvelle, archbishop of Besançon, who founded a university here, which existed till the first revolution. The town and its vicinity abound with Roman remains, and a vast amphitheatre has been lately excavated. The principal articles of trade are corn, timber, staves, cheese, ironware, cloth, leather, and wine. Agricultural implements, iron, steel, and copper ware, paper hangings, cotton, silk, and woollen goods, and other articles are manufactured; and Besançon rivals Geneva in watches, of which 300,000 are made annually, employing over 2,000 persons. Over 600,000 bottles of seltzer water are put up annually.—Ancient Vesontio was the chief city of the Sequani, and under the Roman empire was the capital of Maxima Sequanorum. It was rebuilt early in the 5th century by the Burgundians, after having been destroyed by the Alemanni, but was again ravaged by the Huns. It successively belonged to the Frankish kingdom, to the kingdom of Arles, and to the German empire; became the capital of Franche-Comté, and under Frederick I. a free imperial city, and subsequently shared the fortunes of that province, passing with it to France in 1678. In 1814 it was in vain besieged by the Austrians. Victor Hugo, Fourier, and Proudhon were born here.

BESBORODKO, Alexander Andreyevitch, prince, a Russian statesman, born at Stolnoye, Little Russia, in 1742, died in St. Petersburg, Aug. 9, 1799. He was secretary of Rumiantzoff in the Turkish campaigns, and after having risen by his rare natural abilities to various high positions under Catharine II., became imperial chancellor under Paul I. He concluded the treaty of peace at Jassy (1792) and other treaties, and organized the coalition of Russia and Great Britain against France (1798). He was made a count of the German empire by Joseph II., and a Russian prince by Paul I. He was profligate and avaricious, but at the same time a zealous patron of the fine arts, and left a large part of his immense fortune for the endowment of a lyceum.

BESCHERELLE, Louis Nicolas, aîné, a French lexicographer and grammarian, born in Paris, June 10, 1802. He was educated at the collége Bourbon, and afterward employed in the archives of the council of state and as a librarian in the Louvre. His principal works are: *Grammaire nationale* (2 vols. 8vo, 1834–'8; 5th ed., 1851), and *Dictionnaire national, ou grand dictionnaire critique de la langue française*, including technical, historical, and geographical words (2 vols. 4to, 1843–'6), which proved very successful. He also edited with G. Devars the *Grand dictionnaire de géographie universelle, ancienne et moderne* (4 vols. 4to, 1856–'7; new ed., 1865).—His brother, known as Bescherelle jeune, born in Paris, June 12, 1804, an employée of the council of state and the sole author of *Méthode pour apprendre les langues modernes* (4 vols., 1855), has participated in most of his labors. One of their joint works is a *Dictionnaire usuel de tous les verbes de la langue française* (2 vols. 8vo, 1842–'3).

BESITUN. See Behistun.

BESSARABA, a family that took an active part in the politics of eastern Europe from the 13th century to the early part of the 18th. It gave several waywodes to Wallachia, and ruled for a considerable time over Bessarabia. Rudolph the Black founded the principality of Wallachia during the invasion of Batu Khan, and built the towns of Argish, Tergovist, and Bucharest. He died in 1265. Mirce or Mirxa I., waywode from 1382 to 1418, fought against the Bulgarians and the Turks, and distinguished himself at the battle of Kosovo; he was obliged to sign the treaty of 1393, which made him a vassal of Bajazet I. Michael II., the Brave, waywode in 1592, united under his rule Wal-

lachia, Moldavia, and Transylvania. He was assassinated in 1601. Matthew Brancovan, who made an unsuccessful attempt to recover the independence of his country against the Turks, died in 1654. Constantine II. Brancovan, waywode in 1688, served and betrayed in turn the Austrians, Russians, and Turks. He was arrested by order of the Turkish government, taken to Constantinople, and executed with his four sons in 1714. With the death of this prince the Bessaraba dynasty was extinguished.

BESSARABIA, a S. W. province of European Russia, bounded N. and E. by the Dniester, which separates it from Austrian Galicia, and the Russian governments of Podolia and Kherson, S. E. by the Black sea, and S. and W. by Moldavia and Bukowina; area, 14,012 sq. m.; pop. in 1867, 1,052,013, comprising Moldavians, Russians, Bulgarians, Jews, Armenians, Greeks, Gypsies, and French and German colonists. The northern and larger part of Bessarabia is traversed by a low branch of the Carpathian mountains, with a succession of wooded hills and vales, and a fertile soil. The lower part of the province consists of fertile but treeless steppes, watered by tributaries of the Dniester and Pruth, and affording rich pasturage for horses, buffaloes, and sheep. Immense quantities of wheat, barley, and maize are raised. The vine flourishes, and melons and other fruits grow in abundance. Flax, hemp, tobacco, dye plants, and poppies are also raised. Coal and marble have been found in the mountains, and saltpetre in the environs of Soroki on the Dniester. The principal rivers of Bessarabia are the Dniester, the Yalpukh, tributary of the Danube, and the Pruth, which forms a part of the W. boundary. The climate is mild and salubrious, but in the southern parts, which are not sheltered by mountains, the winters are very severe and the summers excessively warm. The seat of government is at Kishenev. The only harbor is Akerman. Other important towns are Bender, Soroki, and Khotin or Chocim, all on the Dniester.—The primitive inhabitants of Bessarabia were nomadic Scythian tribes. It was nominally a part of the Roman province of Dacia. In the 3d century it was occupied by the Goths, and in the 5th it was ravaged by the Huns. Then followed the Avars, Bulgarians, and Slavs. In the 7th century the Bessi obtained the supremacy, and from them the country is said to have taken its name. In the 14th century it formed part of Moldavia, and with it, in the 16th, became tributary to Turkey. It soon after suffered a terrible incursion of Tartars, and subsequently the horrors of frequent wars between the Russians and Turks. In the peace of Bucharest (1812) it was ceded to Russia. By the treaty of Paris (1856) Russia ceded to Turkey the southern part of Bessarabia, which included Ismail, Tutchkov, the district of Kagul, the greater part of that of Akerman, and most of the salt lakes. This was annexed to Moldavia.

BESSARION, John or **Basil,** a Greek scholar, born in Trebizond in 1389 or 1395, died in Ravenna, Nov. 19, 1472. He passed many years in a monastery, became a prominent reviver of literature, and was titular patriarch of Constantinople and archbishop of Nice. Having forfeited the good will of his countrymen by exerting himself with John Palæologus at the council of Ferrara over-zealously, as they thought, for a union of the Roman and Greek churches, he remained in Italy, where Pope Eugenius IV. made him cardinal, and Nicholas V. bishop of Sabina and afterward of Frascati, and legate of Bologna. But for one adverse vote he would have been raised to the papal see, his Greek birth being the chief objection. Sixtus IV. sent him on a mission to Louis XI. to reconcile the latter with the duke of Burgundy; but the French monarch is said to have taken offence at his having visited first the duke, and called him a barbarous Greek, which according to some accounts affected the health of the envoy and accelerated his death. In France and in Germany he instigated crusades against the Turks, after whose capture of Constantinople he was very useful to his fugitive countrymen. His house in Rome became a species of academy, attended by Argyropulos, Poggio, and others, whom he aided in their studies. He bequeathed his books to the Venetian senate, and his valuable collection of Greek MSS. laid the foundation of the library of St. Mark's in that city. He left various writings, chiefly translations of Aristotle and in vindication of Plato, of whom he was a distinguished exponent. He wrote in reply to George of Trebizond *Adversus Calumniatorem Platonis* (1470), which was one of the first books issued from the Roman press.

BESSEL, Friedrich Wilhelm, a German astronomer, born in Minden, July 22, 1784, died in Königsberg, March 17, 1846. His fondness for science was aroused in Bremen, where he was employed in a merchant's office and became interested in nautical and other studies. Acquiring some proficiency in astronomy, he received through Olbers an appointment as assistant in the observatory of Lilienthal. In 1810 he was called to Königsberg, where under his direction an observatory was built and rose to the highest importance, his connection with it ending only with his death. In 1818 he published *Fundamenta Astronomiæ*, a discussion of the observations made upon the fixed stars by Bradley at Greenwich 60 years before, and including dissertations of inestimable value on the method of stellar astronomy. He afterward published regularly his own observations, measured the distance of the star 61 Cygni from the earth, took a distinguished part in all the astronomical discoveries and geodetic discussions of his day, and was considered one of the foremost astronomers of the world, blending theory and practice with a master hand. His posthumous work, *Populäre Vorlesungen über wissenschaftliche Gegenstände*,

edited by his friend Schumacher, was published in Hamburg in 1848.

BESSEMER, Henry, an English engineer, born in Hertfordshire in 1813. He early devoted himself to the improvement of machinery, and acquired celebrity about 20 years ago by his invention of a new practical process for the manufacture of steel (see STEEL), which has been extensively adopted in Europe and in the United States, and the product of which is known in trade as Bessemer steel. Until 1870 his annual income from his patent amounted to nearly £100,000; but his royalty, which until then was one shilling per quintal, has since been considerably reduced. The jury on steel manufactures, in the exposition of 1862, remarked that of 127 patents for improvements in that industry in England, there was only one which had brought about any striking change in the mode of producing steel, or which had been attended with any real or practical commercial result, and this was the process patented by Mr. Bessemer. The report on the Paris universal exposition of 1867 states that "Mr. Bessemer was not the first to attempt the conversion of carburetted iron into steel, although he was the first to propose a practicable process for accomplishing so desirable an object."

BESSIÈRES, Jean Baptiste, duke of Istria, a French soldier, born at Praissac, Aug. 5, 1768, killed near Lützen, May 1, 1813. He entered the service in 1790, and after the victory of Roveredo, Sept. 4, 1796, Bonaparte made him colonel. Commander of the guards of the general-in-chief in Italy and Egypt, he remained attached to that corps for the greater part of his life. In 1802 he became general of division, and in 1804 marshal. He fought in the battles of Rivoli, St. Jean d'Acre, Aboukir, Marengo (where he commanded the last decisive cavalry charge), Austerlitz, Jena, Eylau, and Friedland. In 1808 he achieved a victory at Medina del Rio Seco in Spain. After the failure of the English Walcheren expedition, Napoleon substituted Bessières for Bernadotte in command of the Belgian army. In the same year (1809) he was created duke of Istria. At the head of a cavalry division he routed the Austrian general Hohenzollern at the battle of Aspern and Essling. In the Russian expedition he acted as chief commander of the mounted guard, and on the opening of the German campaign of 1813 he was at the head of the French cavalry. He fell while attacking a defile on the Rippach in Saxony, on the eve of the battle of Lützen. Napoleon, fearing to discourage his soldiers, with whom Bessières was exceedingly popular, prevented for some time the announcement of his death. Greatly affected by his gallant end, and mourning him as one of his most skilful and devoted officers, he wrote a touching letter of condolence to the duchess of Istria, and bequeathed at St. Helena 100,000 francs to the son. A statue in honor of Bessières has been erected in his native town, and his name was inscribed on the arch of triumph and on the bronze tablets at Versailles.

BESTUZHEFF, Alexander, a Russian poet and patriot, born at his father's country seat in the government of Voronezh in 1795, killed in battle in the Caucasus in June, 1837. He was educated in one of the imperial military establishments, and became aide-de-camp of Duke Alexander of Würtemberg in 1825. He edited jointly with Ryeleyeff, in 1823, the literary almanac entitled the "Northern Star," and with him became implicated in the conspiracy and insurrection of 1825. For this he was degraded to the rank of a private without the privilege of promotion, and sent to Yakutsk in Siberia, together with his equally implicated brothers Nicholas and Michael, Ryeleyeff being executed. Here, under the name of the Cossack Marlinsky, he wrote small novels and sketches for the "Telegraph," a periodical of Moscow, and for some others. After two or three years, by a special order of the emperor Nicholas, he was transferred to the army of the Caucasus. There his adventurous and dangerous life had its effect on his style, and he now showed a great talent for description and for analysis of human character and passions. The more considerable of his writings during this period are two novels, *Mullah Nur* and *Ammalat Beg*. Toward the year 1836 Nicholas relented and permitted the advancement of Bestuzheff from the ranks; but shortly afterward he was killed, along with a considerable detachment of Russian soldiers, by the mountaineers, in an ambush near Yekaterinodar.

BESTUZHEFF-RIUMIN, a Russian family of English origin, originally named Best. On their settlement in Russia they took the name of Ruma, which was changed by Peter the Great to Riumin.—PETER MIKHAILOVITCH was Russian minister at Hamburg, and received the rank of count from Peter.—MIKHAIL, his son, born in 1686, was Russian ambassador at Stockholm, grand marshal under the empress Elizabeth, and from 1756 to 1760 ambassador at Paris. His wife, sister of Count Golovkin, entered into a conspiracy with Lapushin against Elizabeth, on the discovery of which she was knouted, had her tongue cut out, and was exiled to Siberia.—ALEXEI, count, brother of Mikhail, born in Moscow in 1693, died in April, 1766. He was educated at Berlin and Hanover, where he was presented to George I. of England and entered his service. In 1718 he returned to Russia, and was sent by Peter the Great as ambassador to Copenhagen. Under Anna he was minister to Hamburg and Copenhagen, and afterward a cabinet minister. Under Elizabeth he was made grand chancellor of the empire. In 1745 he concluded a treaty of alliance with England, and in 1743 a treaty with Sweden by which the royal succession in that country was regulated according to the wishes of Russia. In 1746 he formed a treaty of alliance with Austria against France and Prussia, and in 1748 sent an army into

Germany under the command of Repnin. Soon after he occasioned the ruin of Lestocq, his former patron. Through his influence the Russian troops supported Austria against Frederick the Great in the seven years' war; but their commander, Apraxin, suddenly retired to Russia, and this occasioned the fall of Bestuzheff, who was suspected of having recalled him in the interest of a political intrigue. (See APRAXIN.) He was degraded, but Catharine II. in 1762 restored him to liberty and to his previous social position, creating him a field marshal. He is regarded as the inventor of a preparation known in medicine under the name of *tinctura tonica Bestusewi*.

BETANÇOS, Domingo de, a Spanish missionary, born in Leon late in the 15th century, died in Valladolid in August, 1549. He studied law at Salamanca, joined the Benedictines in Rome, and lived for a time as a hermit at Somma near Naples. In 1514 he went to Hispaniola, acquired the Indian languages, and endeavored to save the natives from Spanish cruelty. Subsequently he labored among the Indians in Mexico and Guatemala, where he established convents. His representations led Paul III. to promulgate a bull in 1537 reminding all Christians that pagan Indians were their brethren, and should not be hunted down like wild beasts. Betanços refused the bishopric of Guatemala, and remained simply provincial of his order. He died shortly after his return to Spain.

BETEL NUT, a name inaccurately applied to the nut of the areca palm (*areca catechu*), because, though sold separately, it is used for chewing in combination with the leaf of the betel pepper (*piper betle*). The habit of chewing this compound has extended from the islands of the Malay archipelago, where it is chiefly found, to the continent of Asia, and its

Betel Pepper (Piper betle).

use is now universal from the Red sea to Japan. Its preparation for use is very simple: the nut is sliced and wrapped in the leaf, with a little quicklime to give it a flavor. All classes, male and female, are in the habit of chewing it, and think it improves the digestion. It gives to the tongue and lips a scarlet hue, and in time turns the teeth perfectly black. The Malays have a hideous appearance from its use, but the Chinese are very careful to remove the stain from the teeth. Persons of rank often carry it prepared for use in splendid cases worn at the girdle, and offer it to each other as people of Europe or America offer snuff.

BETHAM, Sir William, an English antiquary, born at Stradbroke, Suffolk, in 1779, died at Blackrock, near Dublin, Oct. 23, 1853. His father, the Rev. William Betham, was the author of "Genealogical Tables of the Sovereigns of the World" (folio, 1795) and of a "Baronetage" (5 vols. 4to, 1801–'5). The son was brought up as a printer, and his first literary employment was revising a portion of Gough's edition of Camden. In 1805 he became clerk and afterward deputy of Sir Charles Fortescue, and in 1820 succeeded him as Ulster king of arms. In 1812 he had been appointed genealogist of the order of St. Patrick and knighted. He was also deputy keeper of the records of Dublin. Among his works are: "Irish Antiquarian Researches" (2 parts, Dublin, 1826–'7); "Dignities, Feudal and Parliamentary" (1830); "Origin and History of the Constitution of England" (1830); "The Gael and the Cymbri" (1834); and "Etruria Celtica: Etruscan Literature and Antiquities Investigated" (2 vols. 8vo, 1842).

BETHANY, a village of ancient Palestine, on the E. slope of the mount of Olives, 3 m. from Je-

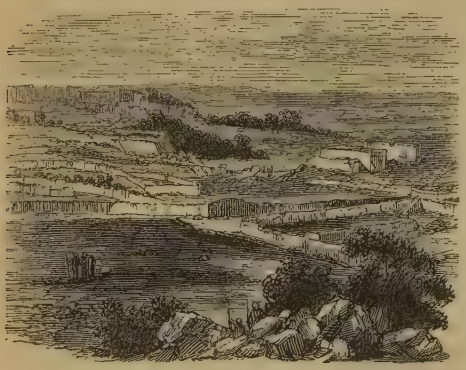
Bethany.

rusalem, mentioned in the New Testament as the place where Christ was anointed, often lodged, and raised Lazarus from the dead, and near which the ascension took place. It is now a desolate and dirty hamlet of about 20 families, called by the Arabs El-Azariyeh, or, according to Lindsay, Lazarieh. The monks and Mohammedans point out various objects of curiosity, among which are a ruined tower which they say was the house of Mary and Martha, and the tomb of Lazarus, a deep vault in the

limestone rock, probably a natural cave remodelled by human labor, in which the Franciscans say mass twice a year. A church, called the castle of Lazarus, was built over this grave by St. Helena in the 4th century. In the 12th century it became the site of a very important monastic establishment. It was still in existence in 1484, but scarcely any vestige now remains.

BETHANY, a post village of Brooke co., W. Va., 10 m. N. E. of Wheeling. It is the seat of Bethany college, established in 1841 by the Rev. Alexander Campbell, the founder of the sect of Baptists called Disciples. This college in 1871 had 9 instructors and 107 students.

BETHEL, a city of ancient Palestine, about 11 m. N. of Jerusalem. It was originally called Luz, and was named Beth-El (house or place of God) by Jacob, who here beheld in a vision the angels ascending and descending. The ruins called Beitin occupy its ancient site, covering an area of three or four acres. On the highest point are the remains of a square tower, and toward the south those of a Greek church



Bethel.

standing on foundations of more ancient date. Bethel was a royal city of the Canaanites, and on the conquest of Palestine by Israel was assigned to Benjamin, but ultimately occupied by the Ephraimites. On the division of the country into the two kingdoms of Judah and Israel, Jeroboam for political purposes built there an altar and set up a golden calf, to prevent the Israelites from resorting to the sanctuary at Jerusalem.

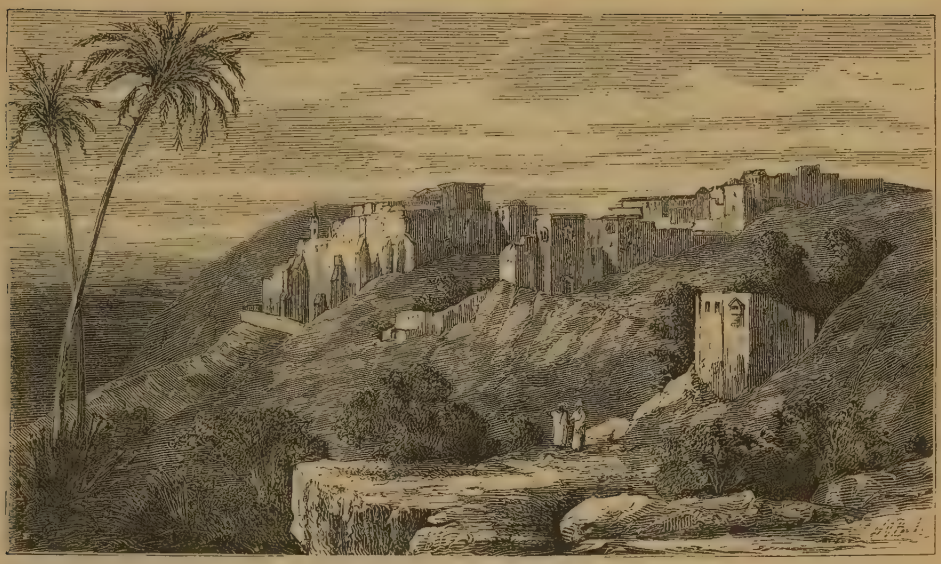
BETHEL, a town of Oxford co., Maine, on the Androscoggin river and the Grand Trunk railroad, 70 m. N. N. W. of Portland; pop. in 1870, 2,286. It is rendered attractive to tourists by the beauty of the surrounding scenery. The principal points of interest in the vicinity are Screw Auger falls, Rumford falls, Partridge falls, White Cap mountain, and Glass Face mountain; the White mountains are 25 m. distant. The town contains 3 hotels, 5 churches, manufactories of woollens, starch, lumber, carriages, spools, furniture, blinds, &c., and an academy with 150 pupils.

BÉTHENCOURT, Jean, seigneur de, a French navigator, born in Normandy, died in 1425. He was chamberlain of Charles VI. of France, and having been ruined in the Anglo-French wars, he organized in 1402, with Gadifer de la Salle and others, an expedition from La Rochelle in quest of adventures. After touching at the Spanish ports, and taking on board a Guanche prince, Augeron, whom he found at Cadiz, he sailed for the Canaries. He visited the islands separately, and constructed a fort on Lanzarote. Finding his forces insufficient to subdue the natives, he returned to Spain for reënforcements, leaving Gadifer in command, who succeeded in subjugating a considerable number of the natives before Béthencourt's return and resumption of the supreme power under the title of *seigneur* or lord of the islands. He converted the king to Christianity in 1404, and the conversion of the greater number of the Guanches followed. Béthencourt wished to extend his conquests to Africa, but dissensions arose between himself and Gadifer, which were decided by Henry III. of Castile in favor of Béthencourt. The latter introduced French laborers into the islands, had a bishop named by the pope in 1405, and, after deputing his nephew as governor, returned to France in 1406, spending the rest of his life on his estates. His achievements are related in *L'Histoire de la première descouverte et conqueste des Canaries* (Paris, 1630). His nephew was the founder of a Spanish family (Betancurt or Betancur) which is still prominent.

BETHESDA (Heb., place of mercy or place of effusion), the name of a pool or fountain which, according to Scripture, was situated near the sheep gate of Jerusalem, and had porches or resting places around it for the sick. (See JERUSALEM.)

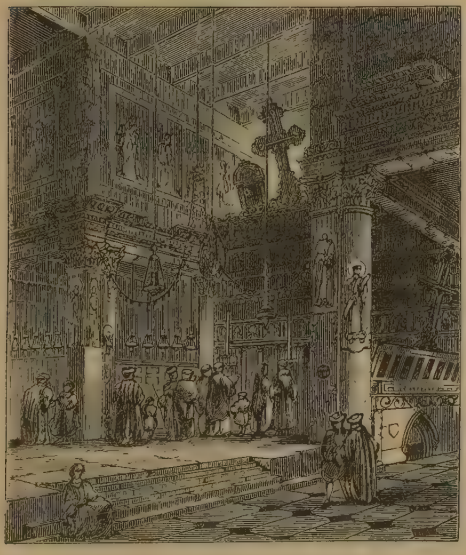
BETH-HORON (Heb., place of caverns), **Upper** and **Lower,** two villages of ancient Palestine, situated 9 m. N. W. of Jerusalem. The former is identical with the modern village of Beit Ur el-Foka, and the other corresponds to Beit Ur el-Tahta. There is a pass between the two villages, down which Joshua pursued the Amorite kings. Beth-horon was included within the district of Ephraim. Solomon fortified it, probably on account of its commanding position and because it was the key of the principal pass to Jerusalem. Traces of ancient walls are still visible.

BETHLEHEM (Heb., place of bread; Arab. *Beit Lahm*, house of flesh), an ancient town of Palestine, belonging to the tribe of Judah, 6 m. S. of Jerusalem. It was called Bethlehem Ephratah to distinguish it from a Bethlehem in Zebulun, and is famous for many remarkable events, as the birth of David and his inauguration and anointing by Samuel. But that which renders Bethlehem eminent in Christian history is the birth of Jesus. A large convent divided among the Greeks, Catholics, and Armenians, and which contains a church, is built over the spot where that event is sup-



Bethlehem.

posed to have occurred. The church is stated by Eusebius to have been erected by Helena, the mother of Constantine the Great, about 327. It consists of a basilica about 120 ft. long by 110 broad, divided into a nave and four aisles supported by ranges of Corinthian



Church of the Nativity, Bethlehem.

columns. The choir is portioned off by a low wall, and is divided into two chapels belonging respectively to the Greeks and Armenians. From each chapel a staircase leads down to the grotto of the nativity. At the E. end is a small semicircular apse with a marble slab on its floor. This is pointed out as the spot where Christ was born. Opposite this is a marble trough said to occupy the place of the original one. In the catacombs are shown the study and tomb of St. Jerome, and the tombs of other saints. Another curious place near Bethlehem is the milk grotto, where the Virgin is said to have hid herself with her babe from Herod. Bits of the rock are chipped off and sold to pilgrims, who believe that if pounded and eaten it has the miraculous power of increasing a woman's milk. About a quarter of a mile from the town the well of David is pointed out, from which David's three mighty men drew water (2 Sam. xxiii. 16). The present population of Bethlehem is about 3,000, most of whom are Greek and Roman Catholic Christians, and the rest Moslems. There is a considerable admixture of European blood in the natives, probably from the time of the crusades, and it can be detected in their lighter complexion and different type from the other natives. They sell to pilgrims and travellers various relics, some of which are curiously carved. This town was one of the first possessions wrested from the Moslems by the crusaders. It was erected into a see, but in 1244 was overrun by the Tartars. The present town is on the brow of a hill or long ridge, and overlooks the opposite valley. There never has been any dispute that it occupies the site of the ancient town.

BETHLEHEM, a borough of Northampton county, Penn., on the Lehigh river, here crossed by a bridge, 51 m. N. of Philadelphia; pop. in 1870, 4,512. It was settled by the Moravians in 1741, and contains a Gothic Moravian church built of stone, a female seminary, and several schools and benevolent institutions. It is much

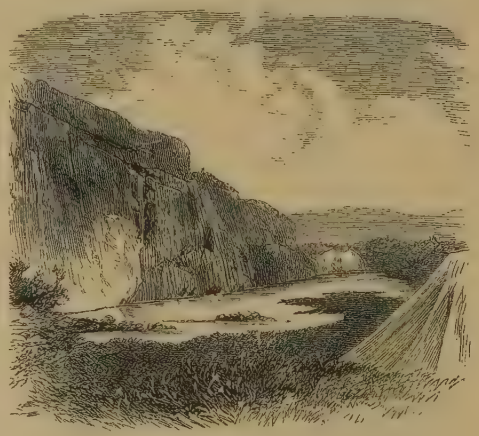
resorted to in summer. It is noted for its iron and zinc manufactories. The Lehigh Valley and Lehigh and Susquehanna railroads connect at this point with the North Pennsylvania road. The Lehigh university (Episcopal) was established here in 1866, through the liberality of Asa Packer, who gave 56 acres of land for its site, and endowed it with the sum of $500,000. In 1871 it had 15 instructors, 48 students in the preparatory and 68 in the collegiate department, and a library of 2,000 volumes.

BETHLEHEMITES. **I.** An ancient monastic order as to which there is great uncertainty, no monastery being known except that at Cambridge, England, said by Matthew Paris to have been founded in 1257. **II.** An order of religious hospitallers founded about 1655 in Guatemala by Fray Pedro de Betancurt of St. Joseph, a native of Teneriffe. He was a Franciscan tertiary, and his associates assumed that habit, but soon adopted constitutions of their own, which were approved by Pope Innocent XI. in 1687. They devoted themselves to the education of the poor and the care of the sick. The order spread to Mexico and Peru, and also, it is said, to the Canary islands, being governed by a general at Guatemala. A year after Fray Pedro's death in 1667, the Bethlehemite nuns were founded by Maria Anna del Galdo, also a Franciscan tertiary, and devoted themselves to the same objects among their own sex.

BETHLEN, Gábor, prince of Transylvania, born in 1580, of an eminent Magyar Protestant family, died Nov. 15, 1629. In 1613, after the death of the two Báthoris, he succeeded, with the aid of Turkey, in being elected prince of Transylvania. Joining the Bohemians in 1619 in the war against Austria, he took Presburg, threatened Vienna, and the Magyar nobles elected him king of Hungary (Aug. 25, 1620). At the beginning of 1622, however, he concluded at Nikolsburg a peace with the emperor Ferdinand II., who ceded to him seven Hungarian counties and two Silesian principalities on condition of his abandoning the Hungarian crown. This treaty being violated by the imperialists, he renewed hostilities in 1623, and at the head of a powerful force invaded Moravia; but, unable to join the Protestant army under Christian of Brunswick, he concluded an armistice, then a treaty of peace, which he again broke in 1626 on his marriage with Catharine of Brandenburg. Shortly afterward he made a third and permanent alliance with Ferdinand II., henceforward devoting himself to Transylvanian interests, and founded an academy at Weissenburg (now Karlsburg), which still exists at Enyed, promoting learning by appointing German professors. He was regarded as one of the pillars of Protestantism.

BETHPHAGE (Heb., place of unripe figs), a place of Scriptural interest which has passed away, leaving no trace behind. It must have been situated somewhere on the E. slope of the range of hills extending N. and S. between Jerusalem and Bethany. By Eusebius and Jerome, and also by Origen, the place was known, though its position is not indicated; they describe it as a village of priests, possibly deriving the name from Beth-phake, signifying in Syriac the house of the jaw, as that part in the sacrifices was the portion of the priests. Schwarz places Bethphage on the S. shoulder of the mount of Offence above Siloam; and Dr. Barclay ("City of the Great King") identifies it with traces of foundations and cisterns in that vicinity, that is, S. W. of Bethany.

BETHSAIDA (Heb., fishing place), the name of two places, as is now generally agreed, of ancient Palestine. One of them is believed to have been situated on the N. W. shore of the lake of Tiberias. Jerome and Eusebius mention Capernaum, Chorazin, Tiberias, and Bethsaida as lying on the shore of Lake Tiberias; and Epiphanius says of Bethsaida and Capernaum that they were not far apart. But the exact position of this Bethsaida has never been indicated, and even the name is unknown to the inhabitants of that part of the country, except such as have learned it from the New Testament. Some writers place it at Khan Minyeh, others, with Robinson, at Ain et-Tabighah; and De Saulcy thinks it was located at Tell Hum. Here was the birthplace of three of Christ's disciples and a frequent resort of Christ himself. The other place appears to have been Bethsaida of Gaulonitis, just above the embouchure of the Jordan into the lake of Tiberias, on the E. side. It was originally a village called Bethsaida, but was rebuilt and enlarged by Philip the tetrarch and named Julias in honor of Julia, daughter of Augustus. This is identified with the place where Christ miraculously fed the 5,000, and where the blind man was restored to sight. Here also Philip the tetrarch died and was buried.



Bethsaida.

BÉTHUNE, a fortified town of Artois, France, in the department of Pas-de-Calais, on the Law and Aire canals, built on a rock above the river Brette, 16 m. N. N. W. of Arras; pop. in 1866, 8,178. It has a Gothic cathedral, a communal college, and several hospitals. The triangular fortress and citadel are among Vauban's finest works. Linen, cloth, beet-root sugar, and other articles, are manufactured here, and the trade is important. The town was ruled by local counts from the 11th to the middle of the 17th century. The title of count of Béthune became extinct in 1807. Gaston d'Orléans took Béthune from the Spaniards in 1645; it was retaken by Prince Eugene in 1710, and definitively annexed to France by the treaty of Utrecht (1713). The first artesian wells are said to have been bored here.

BETHUNE, George Washington, D. D., an American clergyman and author, born in New York in March, 1805, died in Florence, Italy, April 27, 1862. His father, Divie Bethune, a native of Scotland, emigrated to America, settled in New York as a merchant, and became eminent as a man of business and philanthropist. His mother, Joanna, was the daughter of Isabella Graham. (See GRAHAM.) George Bethune was educated at Dickinson college and Princeton theological seminary, and for a short time acted as seaman's chaplain in Savannah, Ga. In 1828 he became pastor of the Dutch Reformed church at Rhinebeck, N. Y., removed in 1830 to Utica, N. Y., and in 1834 to Philadelphia, where he remained as pastor of a church till 1849, when he went to Brooklyn, N. Y., to become pastor of the newly organized "Reformed Dutch Church on the Heights." His health having become impaired, he resigned this charge in 1859 and went to Italy, where he remained about a year. For a few months after his return he was associate pastor of a church in New York. In 1861 he again went to Italy, taking up his residence in Florence, where he died suddenly from an attack of apoplexy. Dr. Bethune was one of the finest scholars and most brilliant orators among the American clergy. He edited, with biographical and critical notices, a volume of "British Female Poets," and prepared a unique edition of Izaak Walton's "Complete Angler," supplying much matter relating to angling in America, a work for which his love of nature and fondness for piscatorial sports admirably qualified him. Many of his addresses and sermons have been separately printed. His last public appearance in America was at a Union mass meeting in New York, April 20, 1861, where he delivered a speech which was one of his most eloquent efforts. He wrote "Lays of Love and Faith," a volume of poems of considerable merit; "Early Lost and Early Saved;" "The History of a Penitent;" "Memoirs of Joanna Bethune," his mother; and "Lectures on the Heidelberg Catechism," an elaborate work in dogmatic theology, originally prepared as a series of lectures for his own congregation. The last two works were published after his death. A memoir of his life, by A. R. Van Nest, D. D., was published in 1867.

BETLIS, or **Bitlis,** a town of Asiatic Turkey, in Kurdistan, about 10 m. S. W. of Lake Van and 60 m. W. of the city of Van; pop. about 10,000, of whom one third are Armenians and Kurds. It is situated in a wide ravine, has several mosques and convents, caravansaries, and an ancient castle on a high rock, formerly the residence of the local khans. Cotton cloths, celebrated for their bright red dye, and various other articles, are manufactured here. Excellent tobacco is exported to Erzerum and Constantinople. The adjoining country is remarkable for its fertility, and abounds in game.

BETROTHMENT, a mutual promise of marriage. Among the ancient Greeks, the father made a selection for his daughter. The young couple kissed each other for the first time in the presence of their friends, and it was customary for the bridegroom to bring flowers daily until the wedding day to the house of his bride. In the laws of Moses there are some provisions respecting the state of the virgin who is betrothed, but nothing particularly referring to the act of betrothment. Selden's *Uxor Hebraica* gives the schedule of later Hebrew contracts of betrothment, which are still in use among the orthodox Jews. The *sponsalia* of the Romans were invested with great legal importance. Children could be betrothed in their seventh year, and a public record was kept of the engagement, certified by the seals of witnesses, the bridegroom giving as a pledge to the bride an iron ring (*annulus pronubus*), after which she proceeded to his house, where sandals, a spindle, and a distaff were presented to her, while a hymn was sung in honor of Thalassius. In the middle ages the Roman and canon statutes constituted the law on the subject. While the Greek church considered betrothments as binding as weddings, the church of Rome viewed them simply as promises of marriage. But as much confusion ensued, the council of Trent decreed that no betrothment was valid without the presence of a priest and of two or three witnesses. This decree was adopted in France by Louis XIII. in 1639, and became known as the *ordonnance de Blois.* Until the revolution of 1789, when betrothments ceased to have legal importance, they were generally celebrated in France by pronouncing the nuptial blessings in front of the church, by reading the marriage contract, and by exchanging presents, while the French bridegroom, as was also the case with the Roman bridegroom, had to pay a certain amount of earnest money to ratify the bargain. In England, formal engagements of this kind were usual down to the time of the reformation. In Shakespeare and other writers many illustrations occur, from which it may be inferred that betrothments were celebrated by the interchange of rings, the kiss, the joining of hands, and the attestation of witnesses. The ecclesias-

tical law which punished a violation of the pledge by excommunication was abolished under George II. Betrothment in England was a legal bar to marriage with another. Previous to Anne Boleyn's execution Henry VIII. obtained a decree of divorce in the ecclesiastical court on the ground of her alleged former betrothment with Northumberland. The only legal remedy against the violation of betrothment at the present time is an action for breach of promise. In Scotland, however, betrothment when taking place with the free, deliberate, and clear "present consent" of both parties, may be enforced against the recusant party, and constitutes marriage itself. (See "Treatise on the New Divorce Jurisdiction," by Macqueen, 1858, and "Exposition of the Laws of Marriage and Divorce," by Ernst Browning, 1872.) In Germany betrothment is still more generally celebrated than in most other countries, and must be legalized by two witnesses. The pledges usually consist in the interchange of rings. The contract may be dissolved by mutual consent; but a violation of it, once attended with severe penalties, is still punished. Children born by the bride to the bridegroom are regarded as if born in wedlock, even if no marriage succeeds the betrothment. In the United States betrothment has only the moral force of a mutual pledge, and in case of a breach of promise the law provides for redress.—Some peculiarities of betrothment among semi-civilized and savage races may be mentioned. The Arab sends a relative to negotiate about his intended bride, and the price at which she is to be had. The bridegroom of Kamtchatka has to serve in the house of his prospective father-in-law before an engagement is allowed to take place. With the Letts and Esthonians no engagement is considered valid until the parent and relatives of the bride have tasted the brandy which the bridegroom presents. Among the Hottentots, the would-be bridegroom is not allowed to propose without being accompanied by his father. Father and son walk arm in arm, with pipes in their mouths, to the house of the bride, where the engagement takes place. Among some of the indigenous tribes of America it was customary to keep the betrothed woman in durance and on short allowance for 40 days, as the superstition prevailed that she would exert an occult influence upon anything she touched or anybody with whom she came in contact.

BETTERTON, Thomas, an English actor, born in 1635, died in April, 1710. He was the son of a cook in the service of Charles I., and was apprenticed to a bookseller in London, who obtained a license for a company of players in 1659, with whom Betterton commenced his career. He was engaged by Davenant in 1662, and became an established favorite. His personal appearance was clumsy and his manner unprepossessing, but he had a singular faculty of thoroughly identifying himself with his part. His last appearance, April 13, 1710, was the proximate cause of his death, as he performed when in ill health, in order to keep his engagement with the public. His widow, an eminent actress, whose first husband was Mr. Sanderson, soon afterward died of grief.

BETTINELLI, Saverio, an Italian author, born in Mantua, July 18, 1718, died there, Dec. 13, 1808. He became a member of the society of Jesus in 1736. From 1739 to 1744 he taught literature at Brescia, and was afterward professor of rhetoric successively at Venice and Parma. He was noted for his eloquence as a preacher and his generous social nature. When the society of Jesus was abolished, he relinquished the professorship which he then held at Modena, and returned to Mantua. His principal works are: *Dell' entusiasmo nelle belle arti* (2 vols., Milan, 1769), and *Risorgimento negli studj*, &c. (2 vols., Bassano, 1775). A complete edition of his works was published at Venice in 1801, in 24 vols. His *Lettere dieci di Virgilio agli Arcadi* were severely criticised on account of their depreciation of Dante and other great writers. His *Versi sciolti* are his best poems.

BETTY, William Henry West, an English actor, popularly known as "the young Roscius," born at Shrewsbury, Sept. 13, 1791. In infancy he accompanied his father, who was a farmer, to Ireland. He made a successful début at the Belfast theatre as Osman when he was about 12 years old, performed at Cork with even greater effect, and was enthusiastically received at Glasgow and Edinburgh. In 1804 he was engaged at Covent Garden for 12 nights, at 50 guineas a night and a clear benefit, and at Drury Lane, on the intervening nights, on the same terms, though John Kemble's weekly salary was under 36 guineas, and Lewis's only £20. He drew immense houses in Hamlet and other characters; and the excitement was so great that the university of Cambridge made *Quid noster Roscius egeat?* the subject of Sir William Brown's prize medal. In 28 nights, at Drury Lane, he drew £17,210, an average of nearly £615 a night, and at least as much more at Covent Garden. After he had secured a handsome income he passed three years at Shrewsbury school. Resuming his profession in 1812, he made an utter failure. Lord Byron had predicted this on account of his corpulence, flat features, ungraceful action, and his "muffin face." He then retired from the stage.—Henry Betty, his eldest son, born Sept. 29, 1819, appeared, after several years' practice in the provinces, at Covent Garden in December, 1844, as Hamlet.

BETWAH, a river of Hindostan, which rises in the Vindhya mountains, near Bhopaul, and flows nearly 340 m. mostly in a N. E. direction, finally joining the Jumna about 30 m. E. S. E. of Calpee. In a portion of its course are beds of iron ore. It is not navigable.

BEUKELS, or Beukelszoon, Willem, a Dutch fisherman, born at Biervliet in 1397, died there in 1449. He is celebrated as being the first who

succeeded in preserving herrings, an art which has proved of such great importance to his country that Charles V. had a statue erected to his memory. The etymology of the word pickle has been traced to his name.

BEULÉ, Charles Ernest, a French archæologist, born in Saumur, June 29, 1826. He was professor of rhetoric at Moulins, and in 1849 became connected with the French school at Athens. His excavations and discoveries there are described in *L'Acropole d'Athènes* (2 vols., Paris, 1854; 2d ed., 1863). This work and his *Étude sur le Péloponnèse* (1855) were published by order of the minister of public instruction, and acquired for him a membership of the academy of fine arts and the archæological chair in the imperial library. In 1860 he became a member of the academy of inscriptions and belles-lettres, and since 1862 he has been perpetual secretary of the academy of fine arts, in which capacity he upheld the ancient prerogative of that body against the decree of Nov. 13, 1863, which remodelled the school of fine arts upon a more modern basis, vesting part of the authority in a special committee. Ingres, Flandrin, and other eminent artists sided with the academy. Besides the works already mentioned, and numerous contributions to scientific, artistic, and literary periodicals, he has published *Fouilles de Carthage* (1860), giving an account of his excavations in that locality; *Histoire de la sculpture avant Phidias* (1864); *Causeries sur l'art*, and *Auguste, sa famille et ses amis* (1867); *Histoire de l'art grec avant Périclès*, and *Tibère et l'héritage d'Auguste* (1868); and the play *Phidias, drame antique*.

BEURNONVILLE, Pierre de Ruel, marquis de, a French soldier, born at Champignolle, May 10, 1752, died April 23, 1821. After serving for some time in India, he became in 1792 aide-de-camp to Marshal Luckner, and was soon after named general-in-chief of the army of the Moselle, and in 1793 minister of war. Sent by the convention to arrest Dumouriez, he was himself arrested by that general, delivered over to the prince of Coburg, and kept in Austrian fortresses till 1795. He afterward became successively general-in-chief of the army of the north, inspector general of infantry, ambassador to Berlin in 1800 and to Madrid in 1802, senator in 1805, and count in 1809. Having voted for the deposition of Napoleon in 1814, he was made by Louis XVIII. minister of state and peer of France, marshal in 1816, and marquis in 1817. Dying childless, he bequeathed his dignities to his nephew, Étienne Martin, who served in the campaigns of 1809–'13, and in 1823 was aide-de-camp of the duke of Angoulême in the Spanish war, and retired from service in 1832.

BEUST, Friedrich Ferdinand von, count, a German statesman, born in Dresden, Jan 13, 1809. He studied political science at Göttingen under Heeren, Sartorius, and Eichhorn, and in 1831 and the following years was employed in the Saxon ministry of foreign affairs. Between 1836 and 1849 he was secretary of legation in Berlin and Paris, chargé d'affaires in Munich, minister resident in London, and ambassador in Berlin. He became Saxon minister of foreign affairs Feb. 24, 1849. He opposed the proclamation in Saxony of the German constitution of March 28, promulgated by the Frankfort parliament, and on the outbreak of an insurrection in Dresden invoked the assistance of Prussia, and accompanied the king in his flight from the capital. On May 14, after the quelling of the outbreak, he was also made minister of ecclesiastical affairs. He agreed with Prussia to join the so-called *Dreikönigsbund*, or union of the three kings of North Germany, but withdrew from this engagement, subsequently favored an alliance with Austria, and adopted a policy more and more reactionary. In 1853 he exchanged the portfolio of ecclesiastical affairs for that of the interior department, retaining at the same time the ministry of foreign affairs; and soon afterward he became the official chief of the cabinet, after having for a long time virtually ruled its councils. During the Crimean war he declined to join Austria, Prussia, and the German diet in a demonstration against Russia, and prevailed upon the minor German states to associate themselves with Saxony at the conference of Bamberg with a view to forming an independent union. At that period and for some time afterward he cherished the idea of reorganizing Germany on the basis of three groups (*die Trias*), formed by Austria, Prussia, and all the other German states under the lead of the German diet. He was confirmed in this project in 1865 when the diet came forward for the first time as a distinct sovereign power by appointing him its ambassador at the Schleswig-Holstein conference in London, where he opposed all tampering with the duchies against the wishes of the inhabitants. Henceforward identified with Austria, whose counsels swayed the German diet, he was regarded as one of the principal instigators of the war with Prussia. He was obliged to withdraw from the Saxon ministry after the battle of Sadowa, and on the recommendation of the king and crown prince of Saxony was appointed by Francis Joseph successor of Count Mensdorff as Austrian minister of foreign affairs, Oct. 30, 1866. Shortly afterward he spent some time in Pesth, where he concerted with the Hungarian statesmen the plan of a dualistic Austro-Hungarian empire; and in June, 1867, on the coronation of Francis Joseph as king of Hungary, he was rewarded with the office of chancellor of the empire, in 1868 with the title of count, and in 1870 with the chancellorship of the order of Maria Theresa, which had been vacant since the death of Metternich. He was thus, though a Protestant, placed at the helm of affairs in the empire of the Hapsburgs. The concordat with Rome was abrogated and other important liberal reforms were carried through under Beust's

administration; and it was chiefly due to his influence that Austria maintained peace with foreign powers, and became apparently reconciled with Prussia at the end of the Franco-German war. His persevering efforts to effect a harmonious union between the non-German and German elements of the empire, as well as his opposition to the ultramontane party and the jealousies excited by his all-controlling influence, involved him in many difficulties, which terminated with his resignation in November, 1871. (See AUSTRIA, vol. ii., pp. 146–149.) The emperor in a complimentary letter thanked him warmly for his past services, and appointed him a member for life of the upper chamber of the imperial diet. In December, 1871, he was appointed Austro-Hungarian ambassador in London.—See Ebeling, *Friedrich Ferdinand, Graf von Beust, sein Leben und vornehmlich sein staatsmännisches Wirken* (2 vols., Leipsic, 1870).

BEUTHEN, the name of two towns of Prussia, in the province of Silesia. **I. Beuthen in Upper Silesia,** or **Oberbeuthen,** in the district of Oppeln, is situated on the Klodnitz, 50 m. S. E. of Oppeln; pop. in 1871, 17,946, having increased during the last ten years with great rapidity. The town has manufactures of cloth and linen, and near it are iron and lead mines. It is the chief place of the possessions of Count Henckel of Donnersmark. **II. Beuthen on the Oder,** or **Niederbeuthen,** in the district of Liegnitz, situated on the Oder, 66 m. N. W. of Breslau; pop. in 1871, 3,826. It is the capital of the former principality of Carolath-Beuthen.

BEVELAND, North and **South,** two islands of Holland, in the province of Zealand, formed by branches of the Scheldt; united area, 154 sq. m.; pop. 28,300. They lie E. of the island of Walcheren. South Beveland, the larger and more fertile, is also called by the Dutch Land van Ter-Goes. It has an active grain trade, and contains Goes, the capital, with a new harbor, and several forts and villages.

BEVEREN, a borough of Belgium, in the province of East Flanders, 6 m. W. of Antwerp; pop. in 1866, 7,151. It has manufactures of lace, linen, cotton, and of wooden shoes.

BEVERIDGE, William, an English prelate, born at Barrow, Leicestershire, in 1638, died in London, March 5, 1708. At the age of 20 he published an able Latin treatise on the Hebrew, Chaldee, Syriac, Arabic, and Samaritan languages. In 1681 he became archdeacon of Colchester; in 1684, prebendary of Canterbury; and at the revolution of 1688, chaplain to William and Mary. He declined the bishopric of Bath and Wells on the deprivation of Bishop Ken for non-juring, but in 1704 he accepted the see of St. Asaph. He left the greatest part of his estate for religious purposes, and his whole life, which he ended in the cloisters of Westminster abbey, was devoted to piety and charity. His works include "Treatise on Chronology," "Canons of the Greek Church to the Eighth Century," and "Private Thoughts upon a Christian Life." The last named, written at the age of 23, but not published until after his death, has been very popular. The first collective edition of his English works was published by the Rev. Thomas Hartwell Horne, with a life and critical examination, in 1824, in 9 vols. 8vo. A more complete edition is that of Oxford in 12 vols. 8vo, 1844–'8.

BEVERLEY, a municipal and parliamentary borough of England, capital of the E. Riding of Yorkshire, 28 m. E. S. E. of York, and 8 m. N. N. W. of Hull; pop. of the municipal borough in 1871, 10,218. The modern part of the town is well built. The most ancient and finest public building is the minster or collegiate church, founded by John of Beverley, with the famous Percy shrine within the choir. St. Mary's church is a large and handsome Gothic building. The ancient grammar school, with a library, is one of the many educational institutions. A new cattle market was built in 1864. The chief trade is in agricultural products, and also in coal, timber, and cattle. There are many tanneries and manufactories of agricultural implements and of firearms, and the iron founderies are among the most extensive in England. Beverley sent two members to parliament till 1870, when it was disfranchised. The origin of the town is traced to the 8th century. Athelstan granted a charter to it in the 10th century. It was a manufacturing town at an early period, but the superior advantages of Hull interfered with its progress. Sir John Hotham, governor of Hull under Charles I., who had been member of parliament for Beverley, was arrested here by his nephew in 1643, on account of his treasonable correspondence with the royalists, and was executed with his son in London.

BEVERLEY, John of, an English prelate, born at Harpham, Northumberland, in the 7th century, died at Beverley in May, 721. He was abbot of the monastery of St. Hilda, and his reputation for learning and piety induced Alfred, king of Northumberland, to obtain his appointment in 685 as bishop of Hexham, and in 687 as archbishop of York. He was the tutor of Bede. In 717 he retired to Beverley, where he had previously founded a college for secular priests. He is said to have written homilies on the Gospels and a commentary on St. Luke, but they are not extant. Bede and others ascribe miracles to him, and he was canonized three centuries after his death. William the Conqueror was said to have refrained from molesting his native place, out of respect for him.

BEVERLY, a post town of Essex co., Mass., on an arm of the sea, opposite Salem, with which it is united by a bridge, and 16 m. N. N. E. of Boston, on the Eastern railroad; pop. in 1870, 6,507. It contains a bank, a weekly newspaper, an insurance office, an academy, and manufactures boots and shoes, &c. Two vessels, with an aggregate tonnage of 220, are employ-

ed in the whale fishery; 24, of 2,500 tons, in the cod and mackerel fishery; and 5, of 1,000 tons, in the coastwise trade.

BEWICK, Thomas, reviver of wood engraving in England, born at Cherryburn, Northumberland, Aug. 12, 1753, died at Gateshead, Nov. 8, 1828. He was apprenticed at the age of 14 to Mr. Ralph Beilby, engraver, at Newcastle-on-Tyne. Having executed in wood the diagrams for Hutton's "Treatise on Mensuration" (published in 1770) and other scientific works, he soon after attempted something better, and at the age of 22 obtained from the society of arts a premium for his wood engraving of the "Old Hound," one of a series of illustrations to Gay's fables. Some years later he illustrated a volume of select fables by Mr. Saint. In 1790 the first edition of the "History of Quadrupeds," illustrated, was published by Mr. Beilby, who had received him into partnership (8th ed., 1824). The designs in this, as well as in Bulmer's editions of Goldsmith's "Deserted Village" and Parnell's "Hermit," were drawn and engraved by Thomas Bewick and his younger brother and pupil John. Their beauty, novelty, and admirable execution attracted general attention, and George III. would not believe they were woodcuts until he was shown the blocks. Somerville's "Chase" was the next work. All the engravings were by Thomas and the designs by John Bewick, who died of consumption in 1795, the year it was produced. Thomas Bewick produced the first volume of his "British Birds," containing the land birds, in 1797, illustrated and partly written by himself. It ranks as the finest of his works. The second volume appeared in 1804, about which time the partnership with Mr. Beilby was dissolved. He published "Select Fables" by Æsop and others, illustrated, in 1818, after which he engaged in preparing for an illustrated history of fishes, which was never completed. Among his pupils, who were numerous, Luke Clennel and William Harvey have most distinguished themselves. His autobiography was published in 1862.

BEXAR, a S. W. county of Texas, bounded E. by the Cibolo river and watered by the San Antonio and Medina; area, 1,450 sq. m.; pop. in 1870, 16,043, of whom 2,303 were colored. The surface is undulating, the borders of the streams are well timbered, and the soil is fertile when irrigated. The chief productions in 1870 were 81,997 bushels of Indian corn, 117 bales of cotton, 7,910 lbs. of wool, and 22,952 of butter. There were 4,615 horses, 4,156 milch cows, 56,640 other cattle, 8,770 sheep, and 1,869 swine. Capital, San Antonio.

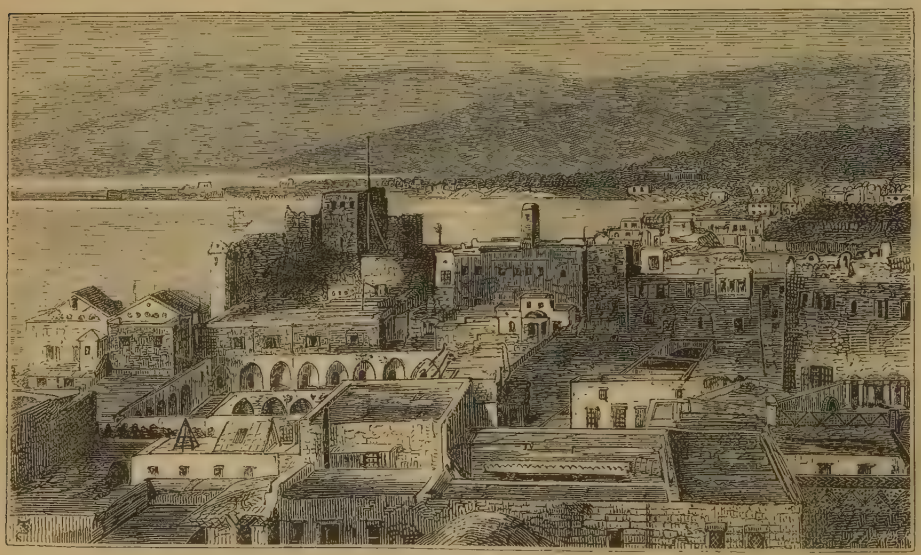
BEXAR DISTRICT, or **Territory,** an unorganized and almost unsettled portion of Texas, in the W. part of the state, bounded S. W. by the Rio Pecos, a branch of the Rio Grande, and N. W. by New Mexico; pop. in 1870, 1,077. The S. E. portion of the district is a table land, the N. W. portion an elevated table land without wood or water, while the N. E. and E. central parts are well watered by the head streams of the Colorado and Brazos.

BEXLEY, Lord. See VANSITTART, NICHOLAS.

BEYLE, Marie Henri, popularly known as STENDHAL, a French author, born in Grenoble, Jan. 23, 1783, died in Paris, March 23, 1842. He was the son of a lawyer, displayed early talent at the central school of Grenoble, went to Paris in 1799, was connected with the civil and military service chiefly with the army in Italy, and was also engaged in various other pursuits according to the promptings of his restless, roving disposition, and of his necessities. Finally he became consul at Civita Vecchia (1830–'42), the exequatur at Trieste, the original place of his destination, having been denied to him on account of his Italian sympathies. He wrote voluminously under various names for many periodicals and journals. Under that of Alexandre César Bombet he wrote in 1814 *Lettres de Vienne sur Haydn, suivies d'une vie de Mozart et de considérations sur Métastase et l'état présent de la musique en Italie* (new ed., 1817, under the name of Stendhal), the life of Haydn being a new version of Carpiani's work, and that of Mozart a free translation from the German. Both works, as well as his *Vie de Rossini*, the only entirely original and best of the series, were translated into English (1820–'24). By his *Histoire de la peinture en Italie* (1817), *Rome, Naples et Florence* (1817), and *Promenades dans Rome* (2 vols., 1829; new ed., 6 vols., 1846), he gave additional evidence of his remarkable familiarity with Italy; while his *Del romantismo nelle arti* (2 vols., Florence, 1819) was written in excellent Italian. In the latter work, as in his pithy pamphlet *Racine et Shakespeare* (1823), which made a sensation at the time of its publication, he reveals himself as an enthusiastic champion of the romantic and adversary of the classical school. His most famous works are *L'Amour* (1822), *Mémoires d'un touriste* (1838), and his romances *Le Rouge et le Noir* (1831) and *La Chartreuse de Parme* (1839)—the latter a delineation of court life at Parma, which according to Balzac is chiefly interesting for diplomatists and people moving in official and court circles; but after he had acquired a wider popularity Balzac as well as Sainte-Beuve extolled him as a writer of wonderful genius, originality, and critical power. The number of his readers, at first limited, has been lately increasing. A complete edition of his writings was published at Paris in 18 vols., 1855–'6; and in 1857 Prosper Mérimée published his *Correspondance inédite* in 2 vols.

BEYROUT, or **Beirut** (anc. *Berytus*), a town and the chief seaport of Syria, 55 m. N. W. of Damascus; pop. about 70,000, one third of whom are Moslems, and the rest Christians, Jews, Druses, and foreign residents. It is built on a triangular promontory, the apex projecting 3 m. into the sea and the base running along the foot of Mt. Lebanon. The situation is singularly beautiful, and the climate mild and healthy.

The old city is a dense nucleus of substantial buildings with narrow streets on the shore, whence extends a broad margin of picturesque villas with gardens running up to the summit of the heights. Beyond these are mulberry groves. The streets in the suburbs are wide and passable for carriages, and the houses, which are built of stone, are spacious. The population has nearly doubled within the last few years, partly owing to the opening of commerce with Europe, which has proved very successful, and partly in consequence of the massacre at Damascus in 1860, after which numbers of the Christians there removed to Beyrout. The harbor is partly filled with sand, and vessels have to anchor in the road, or in St. George's bay, so called from the legend that St. George killed the dragon near that place. Beyrout is alternately with Damascus, for six months of the year, the seat of the governor of the vilayet of Syria, as organized in 1865. It is also the residence of the consuls general of most of the European powers and of the United States. It has Greek, United Greek, and United Syrian archbishops, a Jesuit college with a printing office, and a convent of Sisters of Charity. It is the centre of the American Protestant missions in Syria, with a literary and medical college and a theological seminary; and there are two Protestant religious journals in Arabic, and a house of German Protestant deaconesses. A large number of Europeans reside here, which has had the effect of giving new force and vitality to commerce. A macadamized road to Damascus has been built by a French company; and silk-winding establishments, iron works, cotton factories, banking houses, &c., are con-



Beyrout.

ducted mainly by foreigners. The exports are chiefly grain, wool, cotton, raw silk, hides, tobacco, oils, soap, hemp, drugs, figs, raisins, and native wines; the imports from the United States, Europe, and Egypt are kerosene, broadcloth, woollen, cotton, linen, and silk stuffs, rice, sugar, coffee, and foreign wines and other delicacies. The importation of American petroleum during the year 1870 amounted to $120,491 28. The exports to America, mainly of wool, for the same period amounted to $85,340 06.—Beyrout is supposed to have been founded by the Phœnicians, although the first mention of it in classical writings is made by Strabo. Some critics identify it with the Berothah or Berothai of Scripture. In 140 B. C. it was destroyed by Diodotus Tryphon, the usurper of the throne of Syria. After its capture by the Romans and restoration in the time of Augustus by Agrippa, it became a Roman colony under the name of Julia Augusta Felix Berytus. Under Claudius it was embellished by the erection of magnificent theatres, amphitheatres, and other edifices; and under Caracalla it was surnamed Antoniniana. Here Titus after the destruction of Jerusalem celebrated the birthday of his father Vespasian by combats of gladiators, in which a great number of the captive Jews perished. Later it became celebrated as a seat of learning, and particularly of law, and attracted students from distant lands. The emperor Theodosius II. made it a metropolis. In 551 an earthquake laid the town in ruins, and before it was completely restored it fell into the hands of the conquering Moslems, who destroyed alike agriculture, commerce, architecture, and literature. In 1110 it was captured by the crusaders under Baldwin I., and was comprised within the kingdom of Jerusalem. It was again captured by

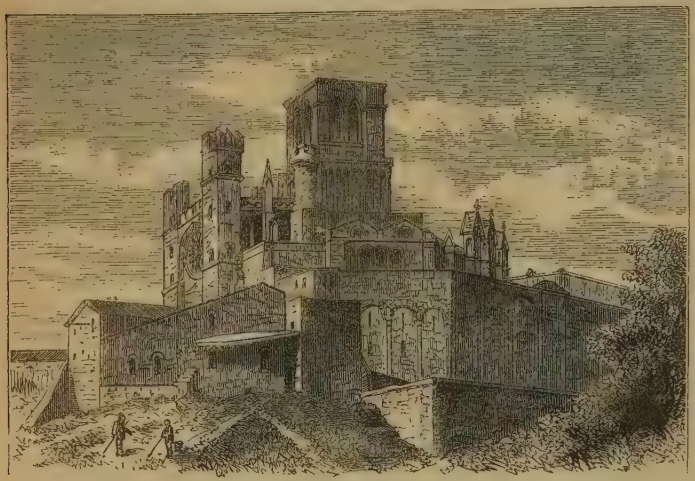
Saladin and retaken by the crusaders, in whose hands it remained till the overthrow of their power in 1291. From that period till the commencement of the 17th century it remained an insignificant place; but the Druse prince Fakreddin rebuilt it as the seat of his government. In 1772 a Russian fleet bombarded and plundered the city. With the Egyptian invasion of Syria Beyrout passed into the possession of Mehemet Ali; but in 1840 the English fleet bombarded it and drove out the Egyptians.

BEZA, or **Bèze, Théodore de**, a French religious reformer, born at Vezelay, June 24, 1519, died in Geneva, Oct. 13, 1605. He was brought up for the law by his uncle, who was a councillor of the parliament of Paris, and studied at Bourges under Melchior Volmar, who enlisted his sympathies for Luther. From 1539 to 1548 he was in Paris, addicted to pleasure and literature, and published there loose Latin poetry under the title of *Juvenilia*. A severe illness changed the turn of his mind, and in 1548 he retired to Geneva, where he made a public profession of the reformed religion. He taught Greek at Lausanne till 1558, when he went to Germany to intercede with the German princes in behalf of the French Huguenots, after which Calvin obtained for him the rectorship and chair of theology at the academy of Geneva. In 1559 he converted Antoine de Bourbon and his wife Jeanne d'Albret to Protestantism, and in 1561 he was the official representative of the Huguenots at the conferences of Poissy, where he displayed ability and moderation. In 1562 he went to Paris to preach the reformation, became chaplain to the prince de Condé and afterward to Coligni, and rejoiced over the assassination of the duke de Guise, though he was not believed to have connived at any deeds of violence. Returning to Geneva in 1563, he took the place of Calvin on the latter's death in 1564, and was the spokesman of the Huguenots at the synods of La Rochelle and Nîmes, and on many other occasions. He married for the second time at the age of 69, and at 78 wrote a spirited poem in refutation of the rumors of his conversion. He was the virtual founder of the academy of Geneva, and produced after Greek models an admirable drama on the sacrifice of Abraham. He published in 1556 a version of the New Testament, which passed through many editions, and took part in a translation of the Bible revised from the Hebrew and Greek texts, which was issued in 1588 by the pastors of the church of Geneva. His *Traduction en vers françois des psaumes omis par Marot* (Lyons, 1563) has been reprinted many times together with Marot's for the use of French Protestant congregations. Among his numerous other works is *L'Histoire ecclésiastique des églises réformées au royaume de France depuis l'an* 1521 *jusqu'en* 1563 (3 vols., 1580). As his name is not ostensibly associated with the authorship of this work, his claims to it are contested by some writers, but generally decided in his favor. The best known biographies are by Schlosser (Heidelberg, 1809) and Baum (2 vols., Leipsic, 1843–'51). See Heppe, *Theodor Beza, Leben und Ausgewählte Schriften* (Elberfeld, 1861).

BEZA'S CODEX (sometimes called the *Codex Cantabrigiensis*, from its present place of deposit, the university of Cambridge, England), a very ancient MS. on vellum, containing in its present state the four Gospels and Acts, but with several omissions. It is usually cited by critics as MS. D of the Gospel and Acts. In the arrangement of the Gospels John stands second. It contains the Greek text with a Latin translation on opposite pages. It is written in large uncial letters, and is generally assigned to the 6th century; but there are some additions which cannot be earlier than the 10th century. It forms a quarto volume of 10 inches by 8, and now consists of 414 leaves. Originally, as is shown by the paging, there were at least 512 leaves. The principal hiatus is between the Gospels and Acts, which it is presumed was occupied by the Epistles. Its critical authority is not ranked high. It is chiefly remarkable for extensive interpolations, which amount in Acts alone to more than 600. The MS. was presented in 1581 to the university of Cambridge by Theodore Beza, who said that it was found in the monastery of St. Irenæus at Lyons, whence it had probably been taken by some Huguenot soldier. The MS. has been several times carefully collated, and has been twice printed, once by Kipling in facsimile (*Codex Bezæ Cantabrigiensis*, 2 vols. fol., 1793), and later in ordinary type with an introduction and annotations (8vo, London, 1864).

BÉZIERS (anc. *Bæterra* or *Bæterræ*), a town of Languedoc, France, in the department of Hérault, at the junction of the Orb with the Languedoc canal or canal du Midi, 38 m. S. W. of Montpellier; pop. in 1866, 27,722. Situated upon a commanding eminence, its fine appearance led to the proverb, *Si Deus in terris, vellet habitare Bæterris;* but the interior of the town is far from attractive. The old walls flanked with towers still remain, but the citadel has been razed and converted into pleasure grounds, in which there is a monument of Riquet, the native engineer of the Languedoc canal. The cathedral of St. Nazaire is a Gothic building surmounted with towers like a Gothic castle. In the church of the Madeleine 7,000 persons were burnt during the Albigensian war. The convents and the bishopric were abolished in 1789, and the episcopal palace has been since used for courts of law and public offices. The town possesses a communal college, a public library, and an economical and archæological society. Silk stockings, woollen and cotton goods, parchment, verdigris, starch, gloves, glass, and famous sweetmeats are manufactured; but the principal industry is that of distilling, and the brandy made here is almost as good as cognac. Owing to the situation near the sea, the commerce is very active in wine (which is produced

in the neighborhood in excellent qualities), grain, honey, oil, almonds, and other articles.—An amphitheatre and other remains of the Roman era still exist. The town dates from 120



Cathedral of St. Nazaire, Béziers.

B. C., but it was named Julia Bæterra in honor of Julius Cæsar, who established a colony here. Flourishing in the 4th century, the Visigoths destroyed the town in 450, and Charles Martel in 738, in wresting it from the Moors. In 1209 the fearful massacre of the Albigenses depopulated the place, the loss of life reaching over 20,000, and according to some authorities over 50,000, besides the victims in the Madeleine. In 1229 Béziers was united with the French crown, after having been ruled in the 10th century by the local counts of Septimania, and subsequently by viscounts of Béziers, Carcassonne, and Albi, subject to the counts of Barcelona. Several synods were held here in the 13th and subsequent centuries. Béziers suffered much during the religious wars of the 16th century.

BEZOAR (Pers. *pad-zahr*, poison expeller—*pad*, wind, and *zahr*, poison), a concretion, consisting chiefly of bile and resin, met with as a round or orbicular calculus in the stomach, the intestines, the gall bladder, the salivary ducts, and even in the pineal gland, but mostly in the intestines of certain ruminant animals. Such bodies were once celebrated for their supposed medicinal properties, distinguished by the names of the animals or the countries from which they were obtained, and eagerly bought for ten times their weight in gold. Besides being taken internally as medicines, they were worn around the neck as preservatives from contagion. Modern investigation and experiment have destroyed the charm of these wonderful calculi.

BHADRINATH, or **Badrinath,** a town of British India, in the district of Gurhwal, Northwestern Provinces, situated on the right bank of the Vishnu-gunga or Bishengunga, 55 m. N. E. of Serinagar. It is situated in a valley of the Himalaya, 10,000 ft. above the level of the sea, the neighboring Bhadrinath peaks being 21,000 to 23,000 ft. high. It is celebrated for a temple of Vishnu, supposed to be of ancient origin, though the present building is modern. Below it is a tank 30 ft. square, which by means of a subterraneous communication is supplied with water from a thermal spring. In this tank the sexes bathe indiscriminately, and the ablution and the worship of the chief idol, which is a figure of black marble arrayed in gold and silver brocade, is regarded as efficacious in washing away sins. Nearly 50,000 pilgrims visit the shrine every 12th year, during the celebration of the Kumbh Mela festival. In ordinary years the number of pilgrims is much less. From November to April the temple is closed on account of the cold.

BHAGAVAT GITA. See Sanskrit Language and Literature.

BHAMO, Bamo, or **Bhanmo,** a town of Burmah, on the Irrawaddy, 40 m. W. of the Chinese frontier; pop. about 12,000. The permanent inhabitants are chiefly Lacs, and the transient residents Chinese and Shans (Siamese). The old Shan town of Bhamo or Mhanmo is further up the river Tapan, which joins the Irrawaddy at a short distance from the modern town. The latter, surrounded with a bamboo palisade, contains a Chinese temple and about 2,000 large dwellings, those of the natives being made of reeds thatched with grass, and those of the Chinese of blue-stained brick. It is the seat of a viceroy and the principal trading place between the Chinese caravans and the Burman and Mohammedan merchants. A greater variety of tribes gather at the annual fair and in the bazaar here from December to April than in any other Asiatic town, not excepting Kiakhta. The total annual value of the trade with China is estimated at about £500,000, and sometimes as much as £700,000, including imports of £80,000 worth of silk, besides tea, copper, drugs, and paper, and exports of £230,000 worth of cotton, besides feathers, ivory, wax, edible birds' nests, rhinoceros and deer horns, and sapphires. Among the most industrious dyers and mechanics are the Palongs, who live in the neighborhood on the frontier of China.

BHARTRIHARI, a Hindoo poet of the 1st century B. C., said to have been a brother of King Vikramaditya. According to another tra-

dition, he was the son of a Brahman, and became a poet or a compiler of poetry after having led a gay life. His writings are said to have been the first specimens of Sanskrit literature to become known in Europe, through the translation into German of many of his aphorisms by the missionary Abraham Roger in his *Offene Thür zum verborgenen Heidenthume* (Nuremberg, 1653). The principal work ascribed to Bhartrihari, "The Centuries," is often called an anthology. The first part delineates the Hindoo conception of love; the second part is didactic, and the third part ascetic and mystical. It was first edited at Serampore, with the *Hitopadesa* (1804). Peter von Bohlen published *Bhartriharis Sententiæ et Carmen Eroticum* (Berlin, 1833), and in 1835 a free German metrical translation; and Hippolyte Fauché has published a French translation, *Bhartrihari et Tchaura* (Paris, 1852).

BHATGAN, or **Bhatgong,** a town of N. Hindostan, in the valley of Nepaul, 5 m. S. E. of Catmandoo. It formerly had 12,000 houses and an estimated population of 80,000, with a palace and other buildings of fine appearance. Though much decayed, it is still the favorite residence of the Nepaulese Brahmans.

BHAWALPOOR, or **Bahawulpore.** **I.** A native state of N. W. Hindostan, extending 280 m. along the S. bank of the continuous rivers Ghara (lower Sutlej), Punjnud, and Indus, from Sirhind on the N. E. to Sinde on the S. W., and 120 m. in greatest breadth from the rivers S. to Jussulmeer; area, 22,000 sq. m.; pop. variously estimated at from 250,000 to upward of 600,000. The whole country is a flat desert of arid sand, with the exception of a fertile strip a few miles wide along the rivers, which is annually watered by their inundations. In some portions of this strip the land is well cultivated, covered with thick jungles, abounding in wild hogs, wild geese, and partridges. The principal crops are rice, wheat, maize, indigo, sugar, opium, cotton, and fruits. The population, which consists of Jauts and Belooches, both professing Mohammedanism, and of Hindoos, is more peaceful, orderly, and industrious than that of the neighboring territories. The principal towns are Bhawalpoor, the former capital, Ahmedpoor, the present residence of the khan, Khanpoor, and Dirawul, a fortified post in the desert. The khan is under the protection of the English, and maintains an army of 2,000 regular troops, which he can increase to 20,000 in case of emergency. **II.** A town, the former capital of the state, on the Ghara, 50 m. S. by E. of Mooltan, in lat. 29° 26′ N., lon. 71° 37′ E.; pop. about 20,000. The houses are poorly constructed of brick and surrounded with gardens. The town was once enclosed by a wall 4 m. in circumference, the ruins of which are still visible. Outside of these are large groves of date palms and other trees. There are many Hindoo weavers here, who manufacture excellent scarfs, turbans, chintzes, and colored goods.

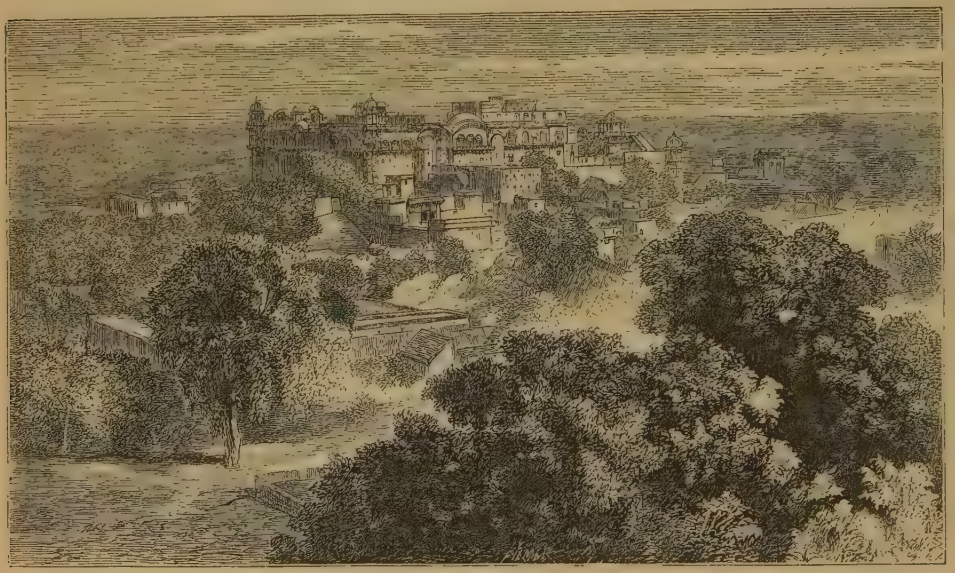
BHEELS (Sanskrit *bhil*, separate; *i. e.*, outcasts), a native tribe of Hindostan, chiefly inhabiting Candeish in Bombay, and numbering over 100,000. They are believed to be the aborigines of Guzerat and adjacent territories, who have been from remote ages described as a distinct people. The earliest notice of them is in the *Mahabharata*. According to their own traditions, they sprang from the union of the god Mahadeo with a beautiful woman whom he had met in a forest, and whose descendants on being driven south settled in W. Candeish and Malwah, in the Vindhya and Satpoora mountains, and along the banks of the Taptee, Mahee, and Narmada. Along the Vindhya range, from Jam to W. Mandoo, the country is exclusively inhabited by Bheels. The principal chiefs are called *bhomiyahs*, of the Bhilalah tribe (descendants of Rajpoots with Bheel women). One of the most notorious of them for his murderous exploits was Nadar Singh. They chiefly worship Mahadeo and his consort Devi, the goddess of smallpox. The Bheels joined in the Indian mutiny of 1857–'8. Lieut. Henry, the superintendent of police, was killed in an attempt to dislodge them from a strong position in Candeish, and another engagement, fought Jan. 20, 1858, near the frontier of the nizam's territory, where the Bheels had mustered in great force, resulted in the loss of 50 European troops. The English authorities have since endeavored to control them by subjection to military discipline.

BHOOJ, a city of S. W. Hindostan, capital of the native state of Cutch, 30 m. N. of the gulf of Cutch, and 160 m. S. S. E. of Hyderabad; pop. about 20,000. It stands at the foot of a fortified hill, is enclosed by a strong stone wall flanked with towers, and contains a castellated palace, a mausoleum, and several temples, mosques, and pagodas, interspersed with plantations of date palms. The fine appearance thus given to the city from a distance vanishes on entering the gates. An earthquake in 1819 destroyed the fort and many buildings, and caused great loss of life. Bhooj is famous for its manufactures of gold and silver.

BHOPAUL, or **Bopal.** **I.** A native state of Malwah, Hindostan, between lat. 22° 32′ and 23° 46′ N., and lon. 76° 25′ and 78° 50′ E., traversed partly by the Vindhya mountains and watered by the Nerbudda and other rivers; area nearly 7,000 sq. m.; pop. about 600,000, chiefly Hindoos. The territory is ruled by a nawaub under the political tutelage of Great Britain. Dost Mohammed Khan, an Afghan, conquered Bhopaul in 1723. Since 1818 the English have asserted their political ascendancy, but not without many complications. During the sepoy rebellion in 1857–'8, the Bhopaul mutineers were defeated Jan. 12, 1858, by Gen. Rose, and a number of them were put to death. **II.** A town, capital of the state, and the seat of the British political resident, about 300 m. S.W. of Allahabad. The old fortifications of the town are dilapidated.

BHOTAN. See Bootan.

BHURTPOOR, or **Bhurtpore.** **I.** A native state of N. W. Hindostan, bordering on the Northwestern Provinces, between lat. 26° 30′ and 27° 50′ N., and lon. 76° 54′ and 77° 49′ E.; area, about 2,000 sq. m.; pop. about 600,000, chiefly Jauts professing Brahmanism. There are few perennial streams, and the soil is sandy, but large crops are produced by abundant irrigation from wells. **II.** A city, capital of the state, 33 m. W. of Agra, and 95 m. S. of Delhi; pop. about 100,000. It is nearly 8 m. in circuit, and was formerly surrounded by a mud wall and wide ditch, and had a fort of great strength. Gen. Lake made four attempts to storm it in 1805, without success, losing over 3,000 men. It was, however, finally surrendered by the rajah, who concluded a treaty April 17; but his death in 1825 producing a contest about the succession, new complications arose, in consequence of which Combermere stormed the town in 1826, having first destroyed a part of the wall by mining. The fortifications were afterward dismantled. Throughout the sepoy rebellion the city remained in the hands of the British.



Bhurtpoor.

BIAFRA. **I.** A small kingdom of W. Africa, on the bight or bay of the same name. It lies between the equator and lat. 5° N., and extends only a small distance into the interior. The principal town, of the same name, is situated not far from the coast. **II. Bight of,** the eastern part of the gulf of Guinea, extending from Cape Formosa on the north to Cape Lopez on the south. The delta of the Niger projects between it and the bight of Benin, some of the mouths of that river being upon either bay. It also receives the rivers Old Calabar, Cameroons, and Gaboon. It contains the islands of Fernando Po, belonging to Spain, and Principe and St. Thomas, to Portugal.

BIALYSTOK (Russ. *Bielostok*), a town of Russia, in the government of Grodno, formerly in the Polish province of Podlachia, on a small tributary of the Narew, capital of a circle of the same name, 45 m. S. W. of Grodno; pop. in 1869, 16,985, about 12,000 of whom are Jews and nearly 4,000 Roman Catholics. The town is well built, mostly with one-story brick houses. It has a beautiful castle, formerly belonging to the counts Branicki, but now to the municipality, adjoining which are superb pleasure grounds. Leather, cloth, cotton and woollen goods, soap, and other articles are manufactured, and there is an active trade, chiefly in grain and timber, with Poland, the fairs being very lively. Together with the territory now forming the circle, the town was transferred to Prussia at the partition of Poland in 1795, and in 1807 to Russia by the treaty of Tilsit, when this part of Podlachia was formed into a separate district, subsequently united with Grodno.

BIANCHINI, Francesco, an Italian astronomer and author, born in Verona, Dec. 13, 1662, died in Rome, March 2, 1729. He studied under Montanari, and, though he took holy orders, he devoted himself to science. His merits won for him a high position under four successive popes; he became secretary of a committee for the reform of the calendar, drew a meridian line through Italy, but did not complete this work, superintended the antiquities of Rome, and proposed the establishment of a museum of sacred monuments. He was an associate member of the French academy, and was ennobled. His works include *Istoria*

universale provata con monumenti (Rome, 1697); a volume of his astronomical and geographical observations (Verona, 1737); *Opuscula Varia* (2 vols., 1754); and an edition of the *Vitæ Romanorum Pontificum* by Anastasius, which was finished by his nephew (4 vols., 1718–'34).

BIARD, Auguste François, a French painter, born in Lyons in 1800. He began life as a chorister with a view of connecting himself with the church; but following his artistic bent, he became sufficiently proficient in drawing to secure a professorship on board a frigate bound to the East, and he subsequently travelled in Europe, going north as far as Spitzbergen. In 1859 he went to Brazil, visited other parts of South America and the United States, and in 1865 set out on an expedition round the globe. Among his most renowned earlier pictures are the "Babes in the Wood," "Strolling Comedians," and "A Beggar's Family." His travels suggested to him many themes, among which "A Concert of Fellahs," "White Bears attacking a Boat in Spitzbergen," "The Slave Trade," and "An Aurora Borealis in Spitzbergen" were noted. His "Slaves on Board of a Slaver" was exhibited anew in Paris in 1867. He has also produced "Jane Shore" (1842), "The Bombardment of Bomarsund" (1857), and other historical works; but his reputation with the masses rests upon his sacrificing æsthetical rules for the sake of producing great effects, and chiefly upon his knack in delineating the grotesque characteristics of the lower classes, on account of which Edmond About called him the Paul de Kock of painters, while more fastidious critics deny to him all higher artistic merit. Among his many amusing productions of the kind are "Honors Easy," "The Family Bath," and "National Guard of the Banlieu;" and among the most recent are "The Bourse of Paris" and "A Provincial Lawsuit" (1863). He enjoys great popularity in France and on the continent, and especially in England, where engravings of his pictures are much in demand. In 1862 he published an illustrated work, *Voyage au Brésil.*—His wife, Léonie d'Aunet, a dramatic and miscellaneous writer, who accompanied him to Spitzbergen, but from whom he was separated about 1843, has written *Voyage d'une femme à Spitzbergen* (1854; 3d ed., 1867).

BIARRITZ, a bathing place of France, in the department of Basses-Pyrénées, on the bay of Biscay, 5 m. W. S. W. of Bayonne; pop. in 1866, 3,652. The air here is more bracing than at Pau. The chief public bath houses are in a small bay called Port Vieux and on the Côte de Moulin. The place contains curious grottoes. It flourished especially during the periodical residence there of Napoleon III. and Eugénie, 1855–'70. The villa Eugénie, as the

Villa Eugénie, Biarritz.

very plain imperial residence was called, is situated on an elevation close to the sea.

BIAS. I. Son of Amythaon, and brother of the seer Melampus, who assisted him in procuring the oxen of Iphicles, without which Neleus would not have allowed him to marry his daughter Pero. He also obtained a third part of the kingdom of Prœtus, king of Argos, through his brother's curing the daughters of Prœtus and other Argive women, who were insane. **II. Of Priene,** flourished at Priene, Ionia, under the Lydian king Alyattes and his son Crœsus, about 570 B. C. He was not only numbered among the seven wise men, but was one of the immortal four to whom the term "sophi" was universally applied. He was a jurist by profession, but his abilities and eloquence were only at the service of those who had right and justice on their side. He in vain sought to prevent the subjugation of the Ionians by Cyrus by urging them to settle in Sardinia; but when his townsmen, after the siege of their city, concluded to depart, he alone made no preparations for the flight, and when asked about it, answered with the words now proverbial in the Latin, *Omnia mea mecum porto.* His maxims have been published by Orelli in his *Opuscula Græcorum Sententiosa et Moralia* (Leipsic, 1819), and a German translation of them is contained in *Fragmente der sieben Weisen,* by Dilthey (Darmstadt, 1835).

BIBB. I. A central county of Georgia, traversed by the Ocmulgee river and several small creeks; area, 250 sq. m.; pop. in 1870, 21,255, of whom 11,424 were colored. The surface is uneven. The soil in the valley of the Ocmulgee is fertile, but in other places is unproduc-

tive. The Central Georgia, the Macon and Western, the Macon and Brunswick, and the Southwestern railroads traverse the county. The chief productions in 1870 were 148,660 bushels of Indian corn, 15,610 of peas and beans, 46,075 of sweet potatoes, and 6,093 bales of cotton. There were 342 horses, 1,008 mules, 1,105 milch cows, 1,986 other cattle, and 4,103 swine. Capital, Macon. **II.** A central county of Alabama, watered by the Cahawba and Little Cahawba rivers, which unite within its limits; area, about 520 sq. m.; pop. in 1870, 7,469, of whom 2,408 were colored. The surface is hilly and the soil productive. Iron ore and coal are abundant. The Selma, Rome, and Dalton railroad skirts the E. boundary. The chief productions in 1870 were 6,828 bushels of wheat, 82,620 of Indian corn, 13,645 of oats, 14,554 of sweet potatoes, and 3,973 bales of cotton. There were 519 horses, 1,039 milch cows, 2,328 other cattle, 2,981 sheep, and 3,460 swine. Capital, Centreville.

BIBBIENA, Ferdinando Galli da, an Italian architect and painter, born in Bologna in 1657, died about 1743. His designs were of the most sumptuous character, and for many years the duke of Parma and the emperor Charles VI. of Germany employed him in painting decorations and architectural pieces, and in conducting triumphal processions, which were famous throughout Europe. To him the stage is indebted for the invention and decoration of movable scenery. He published several works on architecture and on the theory of perspective.—His father Giovanni Maria, owner of the Bibbiena estate in Tuscany, whence came the surname, his brother Francesco, and his son Antonio were all distinguished for a considerable degree of the same talent.

BIBER, George Everard, an English clergyman and author, born in Germany in 1801. He received his degree as doctor of philosophy in Tübingen and of doctor of divinity in Göttingen, became connected with Pestalozzi's schools at Yverdun, Switzerland, and published *Beitrag zur Biographie Heinrich Pestalozzi's* (St. Gall, 1827). About this period he took up his residence in England, in 1839 became a naturalized British subject, and since 1842 has been curate of Roehampton, Surrey. He has taken an active part in many church movements, edited for several years the "John Bull," and contributed much to the "English Review" and other periodicals. His many publications include "The Standard of Catholicity" (1840); "Sermons Occasional and for Saints' Days" (1846); "Bishop Blomfield and his Times" (1857); and two essays (1870) entitled "The Value of the Established Church to the Nation" and "Robbing Churches is Robbing God."

BIBERACH, a town of Würtemberg, in the circle of Donau, at the confluence of the Biberach with the Riss, a tributary of the Danube, 22 m. S. S. W. of Ulm; pop. in 1871, 7,091. It contains four churches, a hospital, and a college, and has tanneries, breweries, manufactories of linen, woollen, and paper, and an active trade in grain. Till 1802 Biberach was a free imperial city. It then came under the government of Baden, but was ceded to Würtemburg in 1806. On May 9, 1800, the French general Moreau won here a great victory over the Austrian general Kray. Wieland was born in Biberach.

BIBESCO, George Demetrius, prince, a Wallachian statesman, born in 1804. He is of a distinguished family, was educated in Paris, and served in important public offices. He aided in the overthrow of Alexander Ghika in 1842, and succeeded him as hospodar (1843), but was driven from power by a revolutionary rising in 1848. In 1857, at the request of the Porte, he aided in preparing for the political union of Wallachia and Moldavia under the rule of a foreign prince. In 1862 he was elected to the Roumanian parliament, but declined.—His brother, BARBO DEMETRIUS STIRBEY, who died in 1869, was hospodar of Wallachia from 1849 to 1856, but absent from his capital during the Russian invasion of 1853–'4; and another brother, JOHN, was minister of religion and education from 1850 to 1853.—Three sons of Prince George served as officers in the French army. One of them, NICHOLAS, distinguished himself in Algeria, and married Ney's granddaughter Mlle. d'Elchingen.

BIBLE (Gr. *βιβλία*, books), the name applied by Chrysostom in the 4th century to the books of the Old and New Testaments, which had been called the "Scripture." The ancient plural has been transformed into a singular noun, in view of the recognized unity of the books of the Bible, which is thus called THE BOOK by way of eminence. The Bible has two general divisions, the Old Testament and the New; the Greek *διαθήκη*, meaning disposition by will, is used both in the Septuagint and in the Greek New Testament for the "covenant" or compact between God and man. The Old Testament was divided by the Jews into three parts, viz., the law, the prophets, and the sacred writings. The law comprised the five books of Moses. The prophets comprised the earlier prophets, so called—the books of Joshua, Judges, 1 and 2 Samuel, 1 and 2 Kings; and the later prophets —three major, Isaiah, Jeremiah, and Ezekiel, and 12 minor, Hosea to Malachi. Under the sacred writings were included the poetical books, Psalms, Proverbs, Job; the "Five Rolls," Canticles, Ruth, Lamentations, Ecclesiastes, Esther; also the books of Daniel, Ezra, Nehemiah, and 1 and 2 Chronicles. The number of the books and their grouping have varied in different versions. Our English Bible gives 39. Jerome counted the same books so as to equal the 22 letters of the Hebrew alphabet; Judges and Ruth, the two books of Samuel, two of Kings, two of Chronicles and the 12 minor prophets making five books. The later Jews of Palestine counted these 24. As to their order, the Masoretic arrangement,

which is that of our present Hebrew Bibles, is very ancient. The Greek-speaking Jews, however, varied from those of Palestine, and their arrangement is preserved in the Septuagint, which is followed in the Vulgate and in our English Bibles; an order not according to chronological succession, but made with a view to grouping similar classes of composition together, the historical being placed first, the poetical next, and the prophetical last. The historical division opens in the book of Genesis with an account of the creation of all things, then takes up the history of the Hebrews as a matter of central interest, showing the separation of the family of Abraham from other nations and their prosperous settlement in Egypt. Exodus describes the escape of the Israelites from Egypt and their organization as a nation under the Mosaic law. Leviticus contains the more special laws of Israel, chiefly those relating to the public worship, festivals, and similar topics. Numbers, with a supplement to the laws, narrates the weary march through the desert, and the opening of the contest for the land of Canaan. In Deuteronomy Moses, drawing near death, reminds the people of the experience they have gone through and the laws they have received, and exhorts them to obedience to God; then appoints a successor, and, taking a first and last look at the land not yet entered, dies. The book of Joshua describes the conquest and partition of Canaan, and the leader's farewell exhortation and death. In the next book, Judges, we read of anarchy and apostasy, and the consequent subjugation of the Israelites by their heathen neighbors, and the exploits of heroes raised up to deliver them. The books of Samuel give his history as prophet and judge, and the story of Saul and David. The books of Kings tell of David's death, the brilliant reign of Solomon, and the subsequent decline, the revolt of the ten tribes, the overthrow of the seceded kingdom of Israel and the fall of the kingdom of Judah into captivity, and the fate of the remnant left in Judea while their brethren were carried away captive. These books tell also of those prophets who testified for God in the face of wicked kings and a degenerate people. The Chronicles are a supplementary work, and are accompanied by the book of Ruth, an episode in the time of the judges, narrating with exquisite grace the marriage of Ruth the Moabitess and Boaz the great-grandfather of David. The Old Testament history closes in the books of Ezra and Nehemiah, which describe the return of the Jewish nation from exile and the restoration of Jerusalem and the temple worship. The book of Esther records events of the Persian captivity.—While the historical books show the development of those religious ideas which underlie the Hebrew national life, the prophetic books show these ideas inspiring the people in their conflicts with unbelief and apostasy, and animating the nation with bright hopes of the future. In all literature there are no books like these, in severe morality, high religious tone, sublime conception, grand diction, and rich imagery. Covering a great extent of time, these prophetic writings vary in style, but they show the struggles of the nation's heart and its foreign relations in a way that lights up the historical books.—The poetical books express the same ideas with the prophetic, but in a more quiet didactic and lyric form. The didactic portion of them consists of the Proverbs, a collection of sententious maxims and wise discourses; Ecclesiastes, an eloquent wail over the transientness of earthly things; and the book of Job, a philosophical poem upon Providence, wonderfully rich in thought and diction, and full of the doctrine of resignation to the mysterious will of God. The Psalms are a collection of devotional lyrics. Lamentations are elegiac patriotic verses. The Song of Solomon is an amatory idyl, which has been explained by many scholars as an allegory.—The New Testament gives the only original account of the origin and early spread of Christianity. It is composed of 27 books. Four contain the memoirs of Jesus; one (Acts) gives the actions of the apostles, especially of Peter and Paul; 21 are apostolical letters; and the collection closes with the Apocalypse. The Gospels of Matthew and John are held to be the work of the apostles whose names they bear. Mark was a disciple of Peter, and Luke a companion of Paul. The book of Acts is also ascribed to Luke. The Epistles are letters called forth by various exigencies, and contain incidental information, throwing much light upon the early constitution and spread of the Christian church, and the development of its doctrines. The Apocalypse is the only book in the New Testament of a strictly prophetic character. It was written shortly after the death of Nero, and strengthened the hearts of Christians against a threatening persecution by giving hope of the approaching kingdom of Christ.—For 1,000 years learned men have been studying the authenticity and arrangement of the constituent parts of the Bible. The history of this work will be found under the title Canon. Far greater study, however, has been given to the original text of Scripture. The Hebrew text of the Old Testament as we have it has already passed through many revisions. Of the primitive text we have little positive information. The books were first written on skins or linen cloth or papyrus, and preserved in rolls. The letter used was the old Hebrew character, which is found on the coins of the Maccabees, and was probably of Phœnician origin. There were no accents nor vowel points, the consonants only being written, and the vowel sounds supplied by the usage of the living speech; and the words were generally run together in a continuous line. Not until the Hebrew became a dead language was its vowel system perfected, to take the place of the familiar usage which was passing away. After the return from the Babylonish

exile, the sacred books were subjected to a careful and critical examination. About the same time the written character of the ancient Hebrew was modified by the Aramaic chirography, until it took the square form, more nearly resembling the Palmyrene letters, which was adopted perhaps on account of its beauty. Simultaneously came another arrangement of the text, with a view to its public reading. Tradition had prescribed the manner in which the reader's voice should emphasize words and balance sentences, but it was long before that mode was declared by any written signs. The first step toward this was the separation of words from each other, and it was followed by the division into verses. This had been marked in poetry very early by lines or blank spaces measuring the rhythm. In prose it was introduced later for the convenience of the synagogue, and was established by the close of the period we are considering. Before this distribution into sentences, the necessity was felt of breaking up the text into sections of less or greater length. In this division the book of the law consisted of 669 paragraphs or "parashes," and these, in the absence of headings and running indices, were known and referred to by the subject that was most prominent in each; for example, parash "Balaam," parash "Bush," or "Deluge." The text, thus written and distributed, was most jealously guarded. In copying it nothing must be added, nothing taken away, nothing changed; letters, words, verses, sections were counted. Rules were made in regard to the way in which the MSS. were to be written; every letter that was larger or smaller, suspended or inverted, or otherwise unusual in its form, even if accidentally so written, was to be heedfully copied. Another division into larger parashes or sections, adapted to the public readings on the Sabbath, was introduced at a later time. The next period in the history of the Old Testament text is the Masoretic, commonly reckoned from the 6th to the 11th century. The word *masora* means a "collection of traditions," and the main object of the laborers in this field was to gather up and arrange the critical material of an older time before the existing traditions should fade out. But the Masorites did more than this; they aimed at completing what had been commenced before; they would fix the reading of the text in all its parts, and their scrupulous care did much to finish and perfect it. They collated MSS., noticed critical and orthographical difficulties, and ventured upon conjectures of their own. Their notes were at first written in separate books; afterward for convenience they were copied upon the margin of MSS., or even at the end of a book, a practice that led gradually to vast confusion. Attempts were even made to crowd the whole Masora upon the margin of MSS., and when the space was too small, as often it was, the annotations were appended to the text or omitted entirely.

Since the completion of the Masoretic period the labors of scholars have been spent in elucidating and perpetuating the Masoretic text. The MSS. of the Pentateuch were very carefully revised, and some of them are very ancient. Of the other books no MSS. date back as far as the Masoretic period: four or five belong to the 12th century; some 50 belong to the 13th; and for the following centuries the number increases. Eminent Jewish scholars of the middle ages devoted themselves to the task of purifying the sacred text by the largest possible collation of MSS., and in their writings speak of famous copies now lost whose use they enjoyed. When the invention of printing had made easy the exact reproduction and extensive multiplication of copies, an attempt was made to compare carefully the best MSS. extant, to collate with them the Masora, and thus to bring out a true and pure Masoretic text; an undertaking too large to be accomplished at once, and therefore but imperfectly executed at that time. The books were produced singly. The earliest printed portion of the Hebrew Bible, the Psalter, was done in 1477, in small folio form, very carelessly, with many abbreviations, and not a few grave omissions. Later, about 1480, it was reprinted in 12mo, without date or place, and again in the same form with an index. The whole Pentateuch, with the points, the Chaldee paraphrase, and Rashi's commentary, was printed in 1482, in folio, at Bologna. In 1486 appeared in two folios, at Soncino, the prophets, early and later, with Kimchi's commentary. The whole Hagiographa was printed in Naples in 1487. The entire Hebrew Bible was first printed at Soncino in 1488. It was made partly from MSS. neither very old, probably, nor very good, and partly from editions of separate books already published. It contained many errors. Only nine copies of this edition are extant. This was strictly followed by the Gerson edition printed at Brescia in 1494, from which Luther made his translation. It was the parent of the first rabbinical Bible of Bomberg, 1517 and 1518, and of Bomberg's manual editions from 1518 to 1521; of the editions of Robert Stephens (4to, 1539–'44), and of Sebastian Münster's (Basel, 2 vols. 4to, 1536). The next independent edition prepared from a fresh comparison of MSS. was the famous Complutensian Polyglot (Complutum, *i. e.*, Alcalá de Henares), the work of Cardinal Ximenes, assisted by the most eminent biblical scholars in Spain. No expense was spared to procure Hebrew MSS. from different countries. The Vatican and other libraries lent their treasures; and 14 years of preparatory labors were spent before the first volume was issued (1522). The text of the Complutensian Bible agrees closely with that of Bomberg's first edition of 1518. The third great original edition is the second of Bomberg's rabbinical Bible, printed in folio at Venice, 1525–'6. This embodies the labors of Rabbi Jacob ben Chajim, who revised the Masora word by word, ar-

ranged it, made an index, and availed himself systematically of its whole apparatus. It was reprinted several times in the 16th and 17th centuries. After these three independent editions, all that follow contain a mixed text. The Antwerp Polyglot, published 1569–'72, at the expense of King Philip II. of Spain, and therefore called the royal Polyglot, was composed from the Complutensian and Bomberg's. Besides the texts in five volumes, four containing the Old and one the New Testament, three other volumes gave a valuable apparatus, critical, philological, antiquarian. The various editions of Plantin followed the Antwerp Polyglot, as did those of Christian Reineccius. It was the basis also of the Paris Polyglot (10 vols. folio, 1645), which gave the text in Hebrew, Samaritan, Chaldee, Syriac, Arabic, Greek, and Latin, containing for the first time in print the Samaritan Pentateuch. It was repeated again in the London Polyglot (6 vols. folio, 1657). Elias Hutter, in his first edition published at Hamburg in 1587, and three times reprinted, used the copies of Venice, Antwerp, and Paris. In 1611 the manual edition of Buxtorf was printed. Buxtorf undertook to improve upon Bomberg's Bible, and as far as he could conformed to the Masora, for whose text he had the highest respect, regarding it as the only perfect one. The next important edition for which the oldest and best MSS. were collated was that of Joseph Athias, printed at Amsterdam, 1661 and 1667. Among the later editions that have followed this, the most noted from their new collation of MSS., careful selection of readings, and thorough correction of points, are those of Jablonski, Berlin, 1699; Van der Hooght, Amsterdam, 1705; J. H. Michaelis, Halle, 1720; Houbigant, Paris, 1753; Simon, Halle, 1752, 1767; Kennicott, Oxford, 1776, 1780; August Hahn, 1831; and G. Theile, 1849. Besides these editions, which aim at bringing the Masoretic text near its perfection, critical helps are found in the Masora contained in the rabbinical Bibles of Bomberg and Buxtorf, and the various readings which are found in all the best editions. The toil and treasure expended upon this long series of editions, each of which was a triumph in its time, have not been wasted. The result on the whole is a text of these ancient and venerable books, not indeed perfect in every point and particle, but more excellent than might have been expected, a text that nearly corresponds with that of the books which constituted the oldest Hebrew canon.—The task of purifying the Greek of the New Testament and bringing it to the perfection of our latest and best editions was much less difficult, yet a work of no small magnitude. Not a fragment from the hand of an evangelist or an apostle survived the early generations that used the original MSS. and wore them out. The early Christians did not feel the importance of laying them sacredly aside. The greater their value, the more extensive was their circulation, and the briefer consequently their existence. The books of the New Testament were written after the custom of the time upon papyrus, or upon parchment, finer and more durable, which was beginning to take its place, and were in the roll form. The writing itself, done with a reed and ink, was in uncial or large letters, and ran in continuous lines, with no spaces between the words, no capitals or stops. The heading of the books, "According to Matthew," "According to Luke," &c., was added later. Some epistles had their address marked upon them, but in others it was inferred from the contents. The title "catholic" ("general" in our English Bibles) was given to certain epistles in the 4th century. As copies of these ancient books multiplied, they naturally varied more or less from the originals and from each other; the copyists confounding similar letters or words, substituting a synonyme for a given term, introducing something from a parallel passage or marginal gloss, or making other alterations unintentional or even intentional, as the copyist tried to harmonize seeming discrepancies or to explain what seemed obscure. These variations, small and great, number not less than 120,000; yet they are mostly variations of spelling or inflection, often impossible to express in a translation. There are not more than 1,600 or 2,000 places where the true reading is at all in doubt, while the doubtful readings which affect the sense are much fewer still, and those of any dogmatic importance can be easily numbered. The MSS. of the New Testament have been classified according to certain literary or geographical affinities. They were divided into the eastern and the western, or according to another description, into an Alexandrine and a Latin, an Asiatic and a Byzantine text. The Alexandrine type of the Greek text was in use among the oriental Jewish Christians who used the Greek version of the Old Testament. The Latin type is found not only in the Latin copies, but in the Greek copies which the Latins used. These groups were not wholly distinct from one another, and it is difficult to fix upon the peculiar reading that belongs to each. The MSS. of the Byzantine class are most uniform. Toward the close of the 4th century no single MS. was known that comprised the whole New Testament. At a considerably later period they were rare, and most of these contained also the Old Testament in Greek. The four gospels were commonly written in one collection, and the Pauline epistles in one. The catholic epistles were classed with the Acts, though sometimes these last two collections and the Pauline were united. MSS. of the Apocalypse were the rarest. The gospels were generally found in the order in which we have them, though in some copies they were transposed. After the Acts usually came the catholic epistles. The order in which the letters of Paul stood varied much. The place of the Apocalypse was fixed by Athanasius at the end of the collection, as it stands at present. By

the 4th century papyrus had given place to parchment, and the form of the roll to that of the book. Breaks in the line and simple points were used. To meet the convenience of the public lecture, the books were measured off into pauses and sentences by lines, after the same manner with the poetical books of the Old Testament. It was not long, however, before other divisions of the text were adopted. In the 3d century Ammonius in making his harmony of the gospels had broken up the text into 1,165 sections, and after the 5th century his arrangement was indicated upon the margin of nearly all the MSS. The gospels were divided into chapters from a very early period, but the present arrangement originated in the 13th century with Cardinal Hugo, who devised it while making a Latin concordance. Erasmus noted it in the margin of his Latin translation, and it was repeated in the Complutensian Polyglot. The subdivision of the chapters into verses was introduced by Robert Stephens in 1551. Cursive or small letters were not generally substituted for the uncial till the 10th century. Uncial MSS. of the New Testament are numerous when compared with the ancient MSS. of other works; and year by year new ones are being discovered. The ages of these to within half a century have been ascertained. To the 4th century belong two or three: the Sinaitic codex (ℵ), now at St. Petersburg, obtained by Tischendorf from the convent of St. Catharine, Mt. Sinai, in 1859, and since published in facsimile at the expense of the emperor of Russia (1862); the Vatican codex (B), containing all the New Testament except the Apocalypse, the epistles to Timothy, Titus, and Philemon, and the last four and a half chapters of Hebrews. This MS. was published by Tischendorf at Leipsic in 1867 and by papal authority at Rome in 1868. To this century perhaps belongs a palimpsest in the British museum containing fragments of John xiii. and xvi., published by Tischendorf. To the 5th century belong seven MSS.: the Alexandrian codex (A), presented by the patriarch of Constantinople to Charles I. in 1628, and preserved in the British museum, and published in 1786 and 1860; the Ephrem palimpsest (C), in the imperial library at Paris, containing in 64 leaves fragments of the Septuagint, and in 145 two thirds of the New Testament, over which had been written the works of St. Ephrem the Syrian, deciphered and published by Tischendorf in 1843; and five other fragmentary MSS. To the 6th century belong 18 MSS.; among them Beza's codex (D), a Greek-Latin MS. of part of the New Testament presented by Beza in 1581 to the university of Cambridge; the *Codex purpureus* (N) written with silver letters on purple vellum; and other MSS. of great interest. From the 7th century we have only several fragments of MSS. To the 8th century are assigned 9, one of the most valuable being the MS. (L) 62 in the imperial library at Paris used by Robert Stephens. The 9th century has left us 20 MSS., besides four which are assigned to the 9th or 10th. From the 10th century we have five. These uncial MSS. (about 75) have been deciphered, some of them with great difficulty; most of them have been accurately collated, and the text of many has been published. Of them all, only one, the recently discovered Sinaitic MS., now has the New Testament complete, though three others originally had the whole, but now lack some parts. Four others have the gospels complete, and four nearly; and about 40 others have portions of the gospels, larger or smaller. The other New Testament books are found more or less complete in some, while in others they are wanting. Besides the 75 uncial MSS. above noticed, there are some 65 lectionaries, or select portions of the gospels or epistles for church services, written in uncial letters, and 1,215 MSS. of some portions of the New Testament and 248 lectionaries in cursive letters.—Most eminent scholars have aided in establishing the text of the New Testament: among the Greeks, Irenæus, Clement, Origen, Athanasius, Eusebius, Epiphanius, the Cyrils, Chrysostom, and Theodoret; among the Latins, Cyprian, Tertullian, Ambrose, Augustine, and Rufinus. The name of Bede brings us nearer home. Alcuin endeavored to purify the Latin text, and Photius labored in the 9th century, Suidas in the 10th, and Theophylact, Acumenius, and others in subsequent ages. Yet 50 years after the invention of printing no attempt had been made to print the original text of the New Testament. The fifth volume of the Complutensian Polyglot contained the original Greek based on MSS. of no special value, so far as may be judged. This volume was printed first of the whole set in 1514, but was not issued until the rest were finished in 1522. Before this, in 1516, Erasmus had issued the first Greek and Latin edition of the New Testament at Basel, constructing his text from five MSS. there. A second edition, changed in some hundred passages, appeared in 1519, a third in 1522, and a fourth in 1527, further altered to conform to the Complutensian, and repeated in 1535 with little change. For 100 years the Complutensian and Erasmian texts were often reprinted with slight alterations. Famous editors of the text were Robert Stephens, a learned printer of Paris (1539–'51), and Theodore Beza (1565–'98). The Elzevirs at Leyden (1624–'41) and at Amsterdam (1656) gave what is known as the "received text," relying upon Stephens and Beza. Bishop Walton's London Polyglot of 1657, Bishop Fell's Greek Testament (Oxford, 1658) and Dr. John Mill's Greek New Testament (Oxford, 1707) gave various readings and versions from many ancient MSS. under the received text. These were the precursors of modern critical editions. Bengel (Tübingen, 1734), Wetstein (Amsterdam, 1751), and Griesbach (Halle, 1744 and 1806) made great advances in critical perfection. The editions of Knapp, Tittmann, Hahn, and Theile

are chiefly based on Griesbach's. Greenfield followed Mill, but gave Griesbach's principal variations. Scholz (Leipsic, 1830–'36) made a wide collation of MSS., and Lachmann a very critical study of a few MSS. The late Dean Alford and Dr. Tregelles in England, and Tischendorf in Germany, are among the most eminent laborers in our own day. Tischendorf's first edition (Leipsic, 1841) followed Griesbach and Lachmann, but subsequently he carried out a most elaborate plan of travel and investigation, and published its results in his second edition (Leipsic, 1849). Other editions have followed in 1850, 1854, and 1855–'9, the last giving valuable accounts of his critical labors, and presenting the best text hitherto published. A new edition begun in 1864 is nearly completed (1873). Tregelles has published (1855–'70) an edition from collation and comparison of MSS. of all the Greek fathers down to the Nicene council. His edition is incomplete, being interrupted by the state of his health. The various critical editions of the New Testament bear conclusive witness to the genuineness of the text in every matter of importance. There has been no material corruption in the sacred record.—The ancient translations of the Old and New Testaments are in some respects of great value. The oldest of these and the most celebrated is the Greek version of the Old Testament called the Septuagint (LXX.) from its 72 translators, or perhaps from the 72 members of the Sanhedrim who sanctioned it. It was commenced by Jews of Alexandria about 280 B. C., and was finished in the course of years evidently by different hands. The Pentateuch is pronounced by scholars the best portion of the work; other portions are unequal; here and there it is considered to betray an imperfect knowledge of the Hebrew language. It contains most of the books called the Apocrypha. (See Apocrypha). The Greek Jews, in the declining state of the Hebrew tongue, made great use of the Septuagint, and even the Jews of Palestine held it in high esteem until the Christians in the second century quoted it against them. They then denied its agreement with the Hebrew, and it became odious to them. In Jerome's day there were three differing yet authorized editions of the Septuagint in use: one in Palestine, one at Alexandria, and one in Constantinople. Hence the corruptions that mar the MSS. in our possession. The Septuagint was the parent of many translations in Latin, Syriac, Ethiopic, Coptic, Armenian, Georgian, Slavonic, and Arabic. Many oriental versions were made from the Hebrew, of uncertain date; among them the Targums in Chaldee (see Targums), the Samaritan Pentateuch, the Syriac translation called the Peshito or "simple," one of the oldest translations of the Bible, several in Arabic, and one in Persian. There were also other Greek versions, of which the most celebrated was that of Aquila, made about A. D. 135, and valuable on account of its anxious literalness. Fragments of it are preserved in Origen's Hexapla. But after the Septuagint the most famous version from the Hebrew was the Latin version of Jerome, the basis of the present Vulgate. Jerome, who had previously undertaken a revision of the old Latin translation of the New Testament, called the *Itala*, revised the Psalter also from the Septuagint about 383. About 389 he began a new version from the Hebrew, and completed the work about 405. The work, though in parts hastily, was on the whole well done. The translator made use of the Greek versions that were before him, as well as of the Arabic and the Syriac, always, however, comparing them with the Hebrew. The translation, having to contend with a superstitious reverence for the Septuagint, met with a doubtful reception, and made its way slowly into favor, but in the course of 200 or 300 years it was highly regarded at Rome and in other places, but not so highly as to escape corruption from careless copyists, indiscreet revisers, ambitious critics, and reckless theologians. The old Vulgate (the *Itala*) and the new injured each other. Alcuin, early in the 9th century, bidden, and as some think aided by Charlemagne, revised and corrected Jerome's version by the Hebrew and Greek originals. Lanfranc, archbishop of Canterbury in the 11th century, revised it again. The council of Trent (1546), having received a report from a commission that the text was very corrupt, so that only the pope could restore it, declared that "the old and Vulgate edition . . . shall be held as authentic, . . . and that no one, on any pretext whatever, may dare or presume to reject it." The council also decreed that the edition "should be printed as accurately as possible." As it had become necessary to prepare an authentic edition of the authorized version, two popes, Pius IV. and V., addressed themselves to this task; learned men were assembled, a printing press was erected in the Vatican, a pontiff looked over the printed sheets, and the work was published in 1590; but it proved to be so imperfect that Gregory XIV. called another assembly of scholars to make another revision. This time the duty was more thoroughly discharged, and the *Biblia Sacra Vulg. Ed. Test. V. Pont. Max. jussu recog.*, &c., the basis of every subsequent edition, was issued in 1592. The famous Bellarmin, one of the translators, wrote the preface.—Translations of the New Testament were made very early into all the tongues then spoken by Christians. A few words upon some of the more modern versions will be in place here. In Germany, Martin Luther spent ten laborious years, from 1522 to 1532, in executing that wonderful translation which has done so much for the Bible and for the language into which it was rendered. Several portions of the Scriptures he had translated into German before, for the use of the people, viz., the penitential and other Psalms, the Lord's prayer, the Ten Commandments, and other

passages, which were often printed. It was not till toward the close of 1521 that he conceived the plan of translating the whole; but having commenced, the work proceeded rapidly. The New Testament was finished first; in a year came the Pentateuch; another year completed the historical books and the Hagiographa; two years more brought Jonah and Habakkuk; and the prophets were finished in 1532. It was all Luther's work. As the foundation he used the Brescia edition of 1494 (his copy is still preserved at Berlin), and with this the Septuagint, the Vulgate, and other Latin versions, while for the New Testament he took the text of Erasmus, 1519. Many versions have been made since Luther's in Germany, but for vigor and simplicity his has not been surpassed, not even by that of Augusti and De Wette. Portions of the Bible were translated into Saxon by Aldhelm, Egbert, Bede, and others, between the 8th and 10th centuries. An English version of the Psalms is supposed to have been made in 1290. Wycliffe finished his translation of the New Testament about 1380. That of the Old Testament, begun by his coadjutor Nicholas de Hereford about 1382, was completed probably by Wycliffe before 1384. The revision made by John Purvey and others about 1388 nearly displaced Wycliffe's, and was widely circulated in MS. among all classes, until superseded by the printed versions of the 16th century. The first volume printed by Gutenberg (1450–'55) was the Latin Bible, and hardly was it completed when versions began to multiply. In 1524, William Tyndale, "finding no place to do it in all England," went to the continent, and there, at Worms, in 1525, printed his version of the New Testament from the original Greek. Coverdale, his fellow laborer, finished his translation of the Old Testament in 1535, and this was followed by several editions of "Matthew's Bible," called also the "Great" Bible, or "Cranmer's," according to its editors. This was the authorized version under Edward VI. The "Genevan Bible," the first English Bible with Roman type, verses, and no Apocrypha, was a new and careful revision from the original tongues by the English refugees at Geneva (1560, and London, 1576). Bishop Parker undertook another version by the help of eminent scholars, which was called the "Bishop's Bible," published in 1568, with preface and notes. Its basis was the "Great Bible," and the "Genevan." A little later appeared the Roman Catholic version known as the Douay Bible, the New Testament in 1582, at Rheims, the Old Testament in 1609–'10, at Douay, upon the basis of the authorized Vulgate. Our present English version was made by direction of James I., who, on motion of Dr. Reynolds of Oxford, in the conference at Hampton Court, commissioned 54 divines to undertake the labor. Seven of the 54 died before the task was commenced, but in 1606 the books were distributed among the remainder in six portions, and the translation was diligently pressed. The "Bishop's Bible" was the basis, faithfully compared with Tyndale's, Coverdale's, Matthew's, Cranmer's, and the Geneva version, and with the original, and corrected where defective. The whole was completed and sent from the press of Robert Barker in 1611. This version has now been in use 260 years, and its faithfulness, pure and strong English, simple yet dignified style, and its common acceptance by persons of all classes and all shades of religious belief, have given it a combination of advantages over any rival. Many have felt, however, that it could be improved in clearness and accuracy. The late Dean Alford especially urged a new revision; and the convocation of Canterbury, in February, 1870, appointed a committee for this work. This committee comprises some of the most eminent Biblical scholars of the church of England, and has invited the coöperation of other eminent scholars both in England and America. The principles of revision have been adopted, and the work is now in progress (1873). A new version has also been long in progress under the care of the American Bible union. (See BIBLE SOCIETIES.)

BIBLE SOCIETIES, associations for publishing and circulating the Bible among the people. The "Society for Propagating the Gospel in New England" bore the expense of printing Eliot's Indian Bible in 1663; the "Society for Promoting Christian Knowledge," established in 1698, published before 1800 an edition of the New Testament in Arabic, one of the Bible in Manks, and four of the Bible in Welsh, besides English Bibles, prayer books, &c. But these and other similar societies in Great Britain did not make the publication and circulation of the Bible their main work. The Canstein Bible institute (*Die Cansteinsche Bibelanstalt*), founded in 1712 by the baron of Canstein, to print and circulate Bibles at a cheap rate, and forming a part of Francke's institute at Halle, Germany, issued from 1712 to 1863 5,273,623 Bibles and 2,630,000 New Testaments. The "Naval and Military Bible Society" was formed in London in 1780, to supply the British army and navy with the Bible. The French Bible society, formed in London in 1792, was prevented by the French revolution from accomplishing its object, the distribution of the Scriptures in France. A new era in Bible distribution, however, commenced with the formation of the "British and Foreign Bible Society" (1804). There had long been a great scarcity of Bibles in Wales. The last edition of 10,000 Welsh Bibles, ordered in 1796 by the society for promoting Christian knowledge, and actually published in 1799, was soon exhausted. The Rev. Thomas Charles, of Bala, a leader among the Welsh Calvinistic Methodists, after vain efforts, first to obtain from this society another edition, and then to publish an edition by subscription, went to London in 1802, where he was introduced to the executive committee of the religious tract soci-

ety (formed in 1799), related to them the destitution of Wales and his desire for a new edition of the Welsh Scriptures, and proposed to organize a society for the purpose. One of the committee, the Rev. Joseph Hughes (Baptist), replied, "Certainly; and if for Wales, why not for the world?" On this idea the committee acted. Mr. Hughes sent out a call for a meeting to consider the project, and the Rev. C. F. A. Steinkopf (German Lutheran in London) offered to gather information concerning the destitution of the Scriptures in foreign lands, while others were to collect similar facts at home. The meeting, held at the London Tavern, March 7, 1804, consisted of about 300 of all denominations, churchmen and dissenters, including Quakers. Dr. Steinkopf's report disclosed an unexpected state of things, and many influential persons present immediately lent their coöperation to the work. The society commenced operations with a subscribed fund of £700, and appointed a president (Lord Teignmouth) and other officers, with an executive committee of 36 laymen, of whom 15 were of the church of England, 15 dissenters, and 6 resident foreigners. The Rev. Joseph Hughes, the Rev. Josiah Pratt (who was soon succeeded by the Rev. John Owen, both of the church of England), and Dr. Steinkopf were the secretaries. The fundamental law declares the society's exclusive object to be to promote the circulation of the Holy Scriptures, without note or comment, both at home and in foreign lands, and restricts the English copies, for circulation at home, to the authorized version. The members pay a guinea annually, and have a discount on Bibles. The first object was to supply Wales, for which the society at once published an edition of 20,000 Bibles and 5,000 Testaments. The society soon extended its labors to the continent, the Turkish empire, India, and other parts of the world.—Roman Catholics for a time coöperated with Protestants in this work; but their society, formed at Ratisbon in 1805 for translating into German and circulating the Bible, was abolished by a papal bull in 1817; and another at Presburg, for circulating the Scriptures in Hungarian, was similarly dealt with. The Russian Bible Society, authorized by an imperial ukase in 1813, was suspended by the same authority in 1826, and a Protestant Bible society was established in its place. The kings of Prussia, Bavaria, Sweden, and Würtemberg have been patrons of Bible societies. Such societies have been established in almost all parts of the civilized globe. The British and foreign Bible society alone had in 1870 4,263 auxiliaries, branches, and associations in Great Britain connected with it, besides 527 auxiliaries and branches of the Hibernian Bible society, 1,053 auxiliaries and branches in the colonies, and numerous agencies and depots in other parts of the world. The same society has issued, up to 1872, 63,299,738 volumes, of which 3,903,067 volumes were in the last year, its entire receipts in cash for the same year being £180,314 19*s.* 2*d.* The society had then directly promoted the translation, printing, or distribution of the Scriptures in 150 languages or dialects, and indirectly in 50 others, making 200 in all.—The first Bible society formed in the United States was the Philadelphia Bible society (1808), which was followed by the Bible societies of Connecticut (May, 1809), Massachusetts (July, 1809), New Jersey (latter part of 1809), New York city (1810), and others, to the number of 50 or 60 before 1816. The "American Bible Society" was formed in New York in May, 1816, by a convention of delegates from 35 local Bible societies and 4 from the society of Friends, making 60 persons in all. The constitution declares: "The sole object shall be to encourage a wider circulation of the Holy Scriptures, without note or comment. The only copies in the English language, to be circulated by the society, shall be of the version now in common use." "Each subscriber of $3 annually shall be a member. Each subscriber of $30 at one time shall be a member for life. Each subscriber of $150 at one time, or who shall by one additional payment increase his original subscription to $150, shall be a director for life; but [this was added in 1872] he shall not be such director when he is in receipt of any salary, emolument, or compensation for services from the society." The original officers of the society were the Hon. Elias Boudinot, LL. D., president; 23 vice presidents; the Rev. John M. Mason, D. D., secretary for foreign correspondence; the Rev. John B. Romeyn, D. D., secretary for domestic correspondence; John Pintard, LL. D., recording secretary and accountant; Richard Varick, treasurer; and 36 managers. All the original officers served gratuitously. The first paid officer was John Nitchie, agent and accountant (1819), subsequently general agent and assistant treasurer. The Rev. John C. Brigham, D. D., assistant secretary 1826–'8, and corresponding secretary 1828–'62, was in his long service almost identified with the society. The presidents since Mr. Boudinot have been the Hon. John Jay, 1821–'8; the Hon. Richard Varick (first treasurer), 1828–'31; the Hon. John Cotton Smith, 1831–'45; the Hon. Theodore Frelinghuysen, 1846–'62; the Hon. Luther Bradish, 1862–'3; James Lenox, Esq., 1864–'71; Wm. H. Allen, LL. D., 1872. The Methodist Bible society was dissolved in 1836, and since 1840 one of the secretaries has been from that denomination. The present secretaries (1873) are the Rev. Joseph Holdich, D. D., elected in 1849, and the Rev. Edward W. Gilman, elected in 1871; the treasurer is William Whitlock, jr., elected in 1840; the assistant treasurer, Andrew L. Taylor, elected in 1869; general agent, Caleb T. Rowe, elected in 1854. The society's receipts for the first year were $37,779 35, and it issued 6,410 Bibles and Testaments; for the 56th year, ending March 30, 1872, its receipts

were $689,923 47, and its volumes issued (Bibles or parts of Bibles) were 1,100,871. For the whole 56 years, its total receipts were $14,980,331 15, and its whole number of volumes issued was 28,780,969. The receipts for the second year were the least of all, $36,564 30; and those for the 54th year, $747,058 69, the largest. The number of volumes issued the first year, 6,410, was the smallest, and that of the 49th year, 1,830,756, the largest. For 25 years the society was unincorporated; but the legislature of New York granted an act of incorporation March 25, 1841, and by act of April 13, 1852, granted special authority to purchase, hold, and convey its real estate on Astor place, with all buildings and improvements that might be put upon it. The society, having previously occupied various rooms for its business, erected in 1822 a building, 50 ft. front by 100 deep, long known as 115 Nassau street, and occupied it, with an addition made subsequently, till 1853. The society needing more room, the cornerstone of the "Bible House" in Astor place was laid June 29, 1852, and the new building was occupied in the early part of 1853. The edifice and ground cost about $300,000. The building covers a square of about three fourths of an acre, fronting on four streets, with an open court in the centre, is six stories high, built of brick with freestone copings, and commands attention by its magnitude and proportions. In 1847 the managers of the American Bible society found that their Bibles and those of England had many small discrepancies which embarrassed the proof-readers. A thorough collation was therefore made by the Rev. James W. McLane, D. D., under the direction of the committee on versions, of the society's royal octavo Bible, with four leading British editions (London, Oxford, Cambridge, and Edinburgh), and the edition of 1611. This collation, which was finished May 1, 1851, extended to all the details of typography, including orthography, capital letters, words in italics, punctuation, brackets, hyphens, &c.; and though the number of variations or discrepancies noted in the text and punctuation of the six copies compared fell but little short of 24,000, not one of the entire number marred the integrity of the text, or affected any doctrine or precept of the Bible. In reducing these variations to one uniform standard, the committee made a few changes, which they considered typographical corrections of the text, and also modernized somewhat the chapter headings and other accessories of the text; but, as this part of their work gave dissatisfaction in some quarters, the managers concluded, in January, 1858, so far to modify the new standard as to omit every alteration which had not the sanction of previous editions. This was accordingly done in 1858–'60, and the volumes now published by the society are considered remarkably free from errors of the press, and are conformed as nearly as possible to the best editions which have been in circulation for generations. The society does not publish the Apocrypha. Its managers are 36 laymen, belonging in 1871 to seven different denominations; and any minister of the gospel who is a member of the society may meet and vote with its board of managers. It sells and distributes its books in this country, as far as possible, through its auxiliary societies, which (1873) number about 2,000, with probably 5,000 or more branch organizations connected with them. At the 50th annual meeting in May, 1866, the society resolved to undertake without delay a third general supply of the whole country (the two previous being in 1829 and 1856), and this undertaking has been vigorously prosecuted with the intention of supplying the Bible to every family willing to receive it. The society also aids other benevolent institutions by making grants of money or books for use at home or abroad, or furnishing stereotype plates or other assistance. It has three agencies of its own and about 55 colporteurs in foreign lands; it has for many years offered the aid requisite to publish new translations made by American missionaries of the Old Testament or the New, or any entire Gospel or other book of the Bible; it has printed the Bible, or portions of it, in about 27 new translations, besides publishing, at home or abroad, about 23 others; it has prepared and published the entire Bible in raised letters for the blind (8 folio volumes costing $20, or 16 folio volumes costing $28); and it publishes accounts of its doings in its annual reports and monthly in the "Bible Society Record."—The "American and Foreign Bible Society" was organized in New York May 13, 1836, and was incorporated by the legislature of New York April 12, 1848. It originated in a secession of the Baptists from the American Bible society, after the latter society refused aid to the Bengalee and Burmese versions made by Baptist missionaries, because in these versions the Greek word *βαπτίζω* and its cognates were translated "immerse," "immersion," &c. The Rev. Spencer H. Cone, D. D., who had been a secretary of the American Bible society, was the first president of the American and Foreign Bible society, and the Rev. Charles G. Sommers, D. D., its first corresponding secretary. The constitutions of the two societies are nearly alike, except that the managers of the latter are required to be Baptists. The society has primarily aided the missionaries of the American Baptist missionary union and kindred societies in translating, revising, printing, and distributing the Scriptures in foreign lands, its surplus funds being applied, at the discretion of the managers, to Bible operations in all lands. It has employed Bible readers in the United States, Canada, Mexico, Germany, Denmark, Sweden, China, Greece, &c. It publishes and circulates in this country the commonly received or King James's version. In 36 years it has collected and expended more than $1,100,000 in Bible circula-

tion, published the Scriptures in 40 different languages, and circulated 4,000,000 volumes in our own and foreign lands. "The Bible Advocate" is its monthly periodical. Its officers for 1872 are the Hon. D. M. Wilson, president; the Rev. A. D. Gillette, D. D., corresponding secretary; U. D. Ward, treasurer. — "The American Bible Union" was organized in New York, June 10, 1850. Its object is "to procure and circulate the most faithful versions of the Sacred Scriptures, in all languages, throughout the world." Its founders seceded from the American and Foreign Bible society May 23, 1850, when that body decided that it was not its province or duty to revise the English Bible, nor to procure a revision of it from others; and that in its future issues it would only circulate the existing commonly received version. The membership is composed of voluntary contributors, $30 constituting a member, $100 a director for life. The field of its operations is the world. It has aided extensively in the preparation or circulation of versions made on its principles, for the Chinese, Karens, Siamese, French, Spanish, Italians, Germans, and English. But the primary aim of the union is to prepare a thorough and faithful revision of the common English version. To accomplish this it has employed the aid of scholars of nine evangelical denominations. Though mainly composed of Baptists, it professes to act without reference to denominational differences. The principle adopted for the guidance of translators is: Express in language most readily understood by the people "the exact meaning of the inspired original." No views of expediency are allowed to withstand the invariable operation of this rule. The New Testament has been subjected to three consecutive revisions, the first extending through a period of eight years, the second of four, and the third of a little more than two years. No expense has been spared in procuring books or supplying every possible aid for the greatest perfection of the work. The book of Job has been revised and published under two different forms: the first embracing the common version, the Hebrew, and the revised version, accompanied with philological notes; the second confined to the revision and notes for the English reader. Genesis and the Psalms have been issued, each in a single volume, combining the notes for the scholar and the English reader. Proverbs has lately been issued in the same form as Job. Exodus, Joshua, Ruth, Judges, 1 and 2 Samuel, 1 and 2 Kings, 1 and 2 Chronicles, have been revised, and the first four of these books are now (1873) undergoing revision for the press. The Bible union has also prepared a "Bible Primer" especially for the freedmen in the south. It has made two translations of the Testament into the Chinese language, one in the character, and the other in the Ningpo colloquial. Its Spanish Testament has undergone three revisions, and is now widely circulated in Spain and Mexico. Its Italian Testament is undergoing revision in Italy. The number of copies of Scriptures which it has issued, or furnished the means for issuing, in all languages, exceeds a million.— The "Bible Revision Association," organized at Memphis, Tenn., April 2, 1853, and afterward removed to Louisville, Ky., suspended operations in the early part of 1860, and passed over its books to the American Bible union. —The history of Bible societies would be incomplete without mention of the controversy with regard to the Apocrypha, in which the European societies were involved from about 1811, and which was not finally settled till 1827. The one idea of Bible societies, the circulation of the Scriptures without note or comment, had to a certain extent engaged all parties indiscriminately, and especially all parties of the reformation. The Roman Catholic church had a different canon of Scripture from the Protestant. On the continent various causes had conspired to separate the Protestants less in this matter from the Catholics than their brethren in Great Britain. Consequently, on the continent, the Catholic canon was in use among Protestants. At first the London society had connived at this difference of sentiment, or at least had not allowed itself to interfere with its free exercise. Thus the German auxiliary societies had from the outset purchased for circulation the Canstein Bible, in which the apocryphal books were intermingled with the canonical (Protestant). A feeling began to be manifest on this subject with greatest violence in Scotland, and the parent society therefore decided in 1811 to request its auxiliaries to leave out the Apocrypha. This request produced some feeling, and it was rescinded in 1813. The apocryphal war was thus fairly commenced; for the passing and subsequent rescinding of the resolution of 1811 brought the parties into position. The inspiration of the apocryphal books was discussed, and the custom of the Protestant church cited, which had translated the Apocrypha, and even in the establishment appointed it "to be read in the churches." While the general sentiment was in favor of the non-inspiration of the apocryphal books, one party insisted on the propriety of their circulation, on the ground that the catalogue of the canon was not inspired, and that even the Protestant canon itself was not an article of faith, but might contain uninspired books. On the other hand, the anti-apocryphal party rigidly defined the difference between the canonical and apocryphal books, designating the apocryphal as "far below the level of many human writings, full of falsehoods, errors, superstitions, and contradictions, and the more dangerous for assuming to be a divine revelation." The Scotch party was violent, the continental unyielding. The publication of the Catholic Bible in Italian, Spanish, and Portuguese, in 1819, with the coöperation of the society, added fresh fuel to the flames. It was thought by the Edinburgh society a violation

of the act of 1813. It was urged that to publish a Bible in which the apocryphal books were made canonical, was worse than merely to publish them as apocryphal at the end of the Old Testament canon. The London society, on a revision of its course, decided it to be erroneous, and resolved, Aug. 19, 1822, that the moneys of the society should henceforth be used only in printing the canonical books, and that if the auxiliaries published the Apocrypha, they should do it at their own expense. When, in accordance with this act, Leander Van Ess asked aid in publishing his Bible, and promised to include the Apocrypha at his own expense, the society appropriated £500 for the purpose (Sept. 24, 1824). The anti-apocryphal party procured the rescinding of the act the following December, on the ground that the apocryphal books were still undistinguished from the canonical, and that therefore, although the society's money was not used to publish them, they nevertheless had the apparent sanction of inspiration by the good company in which the society allowed them to be put, by consenting to have them intermingled with the inspired books. The society, in rescinding the above act of appropriation, advanced only one step further in the apocryphal reform. It had in the act of rescinding declared that the money of the society might be applied to aid those editions of the Bible in which the apocryphal books were printed at the end of the canon. The anti-apocryphal party had already achieved too many victories to be satisfied with such moderate ground. The Edinburgh society now protested (Jan. 17, 1825) against this compromise of Protestantism, and procured in the following February a rescinding act which swept the records of the London society of all former acts on the subject. The matter stood now where it had before 1811, but the anti-apocryphal sentiment was conscious of its strength, and now initiated positive proceedings. A two years' contest followed, in which the ground was all reviewed, and the end of which was a resolution of the London society (May 3, 1827) that no association or individual circulating the apocryphal books should receive aid from the society; that none but bound books should be distributed to the auxiliaries, and that the auxiliaries should circulate them as received; and that all societies printing the apocryphal books should place the amount granted them for Bibles at the disposal of the parent society. Thus ended the controversy, which threatened for a time to split the parent society itself, and which did result in the secession of many auxiliaries on the continent. Previous to this controversy, the Roman Catholic church had in many instances (especially on the continent) acted with the Protestants; but, as already mentioned, that church had abolished the Bible society of Ratisbon (1817) in the midst of the contest. Meanwhile the London society continued the aid of its funds, under its successive prohibitions in reference to the Apocrypha, to the individual enterprise which still persisted, at Munich, in the circulation of the Bible. Gradually the Roman Catholic church withdrew its favor from an enterprise that refused its aid in the circulation of that which she deemed the canon of Scripture, until, from the coöperation which had characterized the early history of Bible societies, the movement became essentially Protestant.—When the British and Foreign Bible society was formed, there was a great destitution of the Bible in all countries; the Bible had been printed and circulated in only 47 languages and dialects; but since 1804 more than 100,000,000 Bibles, New Testaments, and portions of the Bible have been issued by Bible societies; and the Scriptures are now circulated among nearly all the nations of the earth, and in more than 200 different languages and dialects.—Before the invention of printing the Bible was the most expensive book in the world, costing in England, in the 13th century, £30 a copy. At the time of the American revolution the cheapest Bibles were valued at not less than $2 a volume. For some years (1844–'53) the American Bible society sold its nonpareil Bible without references at 25 cents a copy, and its pocket pearl Testament at 6¼ cents; and now (1873) this cheapest Bible is sold at 40 cents, and this cheapest Testament at 10 cents. It is a principle of the society to make the prices of Bibles and Testaments as low as possible.

BIBLIOGRAPHY (Gr. *βιβλίον*, a book, and *γράφειν*, to describe), literally, the description of books. Among the Greeks the term *βιβλιογραφία* signified only the writing or transcription of books; and a bibliographer with them was a writer of books, in the sense of a copyist. The French term *bibliographie* was long used to signify only an acquaintance with ancient writings, and with the art of deciphering them. In its modern and more extended sense, bibliography may be defined to be the science or knowledge of books, in regard to the materials of which they are composed, their different degrees of rarity, curiosity, reputed and real value, the subjects discussed by their respective authors, and the rank which they ought to hold in the classification of a library. It is therefore divided into two branches, the first of which has reference to the contents of books, and may be called, for want of a better phrase, intellectual bibliography; the second treats of their external character, the history of particular copies, &c., and may be termed material bibliography. The object of the first kind is to acquaint literary men with the most valuable books in every department of study, either by means of alphabetical catalogues simply, or by *catalogues raisonnés*, accompanied by critical remarks.—It is the province of the bibliographer to be acquainted with the materials of which books are composed, and their different forms, the number of pages, the typographical character, the number and de-

scription of the plates, the completeness, correctness, and all the other external peculiarities or distinctions of an edition. He knows not only the treatises that have been written on any particular topic, their comparative value, and the various editions of books, but also in what important respects one edition differs from another, when and from what cause omissions have been made, deficiencies supplied, errors corrected, and additions subjoined. When books have been published anonymously or pseudonymously, he indicates the real name of the concealed author; and with regard to the rarity of books, he is acquainted with all the causes which have contributed to render them scarce. In compiling a catalogue, he assigns to them that place which they ought to hold in the system of classification adopted for arranging a public or private collection of books. These legitimate duties of the bibliographer, however, require a variety and extent of knowledge seldom if ever possessed by a single individual, and different writers have selected different fields of labor in the science.—A collection of all the works belonging to the various departments of bibliography would, it has been estimated, exceed 20,000 volumes. The more important of these are indicated or described in Namur's *Bibliographie paléographico-diplomatico-bibliographique générale* (2 vols. 8vo, Liége, 1838); also in Peignot's *Répertoire bibliographique universel* (8vo, Paris, 1812); Horne's "Introduction to the Study of Bibliography," vol. ii. (8vo, London, 1814); Bohn's "General Catalogue," vol. i. (8vo, London, 1847); Petzholdt's *Anzeiger für Bibliographie und Bibliothekswissenschaft*, an important periodical commenced in 1840 in Halle; and in Petzholdt's remarkably full and complete catalogue entitled *Bibliotheca Bibliographica* (Leipsic, 1866). For information upon certain points connected with bibliography, see Book, Bookbinding, Diplomatics, Engraving, Library, Manuscripts, Paper, Printing, and Writing. The following elementary works treat generally upon all matters appertaining to this science. Although most of them are old, and some not well digested, they nevertheless contain much curious as well as useful information:

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Denis, J. M. C. Einleitung in die Bücherkunde. 2d ed., 2 vols. 4to, Vienna, 1795–'6.

Dibdin, T. F. Bibliographical Decameron. 3 vols. royal 8vo, London, 1817.

Horne, T. H. An Introduction to the Study of Bibliography. 2 vols. 8vo, London, 1814.

Mortillaro, V. Studio bibliografico. 2d ed., 8vo, Palermo, 1832.

Peignot, É. G. Dictionnaire raisonné de bibliologie (with supplement). 3 vols. 8vo, Paris, 1802–'4.

Petzholdt, J. Katèchismus der Bibliothekenlehre. 2d ed., 16mo, Leipsic, 1871.

It will readily be seen that to make a universal catalogue, such as would embody the ideal of a bibliographical work by giving the title of every important book ever published in any country, would be literally impossible. The attempt has nevertheless been made, and some of the results, though exceedingly incomplete when compared with the avowed purpose of the catalogue, are most useful to the bibliographer. Even more valuable, however, are those works which more modestly attempt to give a list of only the leading standard books of the world. We give the titles of a few catalogues compiled with either one or the other of these aims:

Allibone, S. A. Dictionary of English Literature and British and American Authors. 3 vols. large 8vo, Philadelphia, 1858–'71.

Appletons' Library Manual; containing a Catalogue Raisonné of upward of 12,000 of the most important works in every department of knowledge. 8vo, New York, 1847.

Bibliotheca Grenvilliana, by J. T. Payne and H. Foss. Part i., 2 vols. 8vo, London, 1842. Part ii., 8vo, 1848.

Bohn, H. G. A General Catalogue of Books. 8vo, London, 1841, pp. 2,100.

Commonly known as the "Guinea Catalogue." It has been reprinted in 3 vols.

Brunet, J. C. Manuel du libraire et de l'amateur de livres. Latest ed., 6 vols., Paris, 1860–'65.

An extensive and useful work, containing notices of 32,000 separate works.

Dantes, A. Tables biographiques et bibliographiques des sciences, des lettres, et des arts. 8vo, Paris, 1865.

De Bure, G. F. Bibliographie instructive. 7 vols. 8vo, Paris, 1763–'8.

Dibdin, T. F. The Library Companion; or, the Young Man's Guide and the Old Man's Comfort in the choice of a Library. Thick 8vo, London, 1824.

Dictionnaire Bibliographique. (Compiled, according to Barbier, by the abbé Du Clos.) 3 vols. 8vo, Paris, 1790.

Ebert, F. A. A General Bibliographical Dictionary, from the German. 4 vols. 8vo, Oxford, 1837.

The original edition was published at Leipsic in 1821–'30, in 2 vols. 4to.

Georgi, J. T. Allgemeines europäisches Bücher-Lexikon, 1500–1757. (With supplements.) 8 vols. folio, Leipsic, 1742 –'58.

Grässe, J. G. T. Trésor des livres rares et précieux, ou Nouveau dictionnaire bibliographique. Dresden, 1858 *et seq.*

Meusel, J. G. Bibliotheca Historica. 22 vols. in 11, 8vo, Leipsic, 1782–1804.

Moore, Dr. C. H. What to Read and How to Read. New York, 1871.

Nodier, C. Description raisonnée d'une jolie collection de livres. 8vo, Paris, 1844.

Porter, N. Books and Reading. 4th ed., cr. 8vo, New York, 1871.

Putnam, G. P., and Perkins, F. B. The Best Reading. 16mo, New York, 1872.

Quérard, J. M. Bibliographie générale du XIX^e^ siècle. Paris, 1863.

Renouard, A. A. Catalogue de la bibliothèque d'un amateur, avec notes bibliographiques, &c. 4 vols. 8vo, Paris, 1819.

As has already been said, it is more common for a bibliographer to select some special department, collecting or cataloguing the works belonging in some one class of literature. Such dictionaries and catalogues applicable to particular branches of knowledge, and comprising the works published on the subjects discussed, would of themselves constitute a library. In the present article we can only mention a few of the more important.

Atkinson, J. Medical Bibliography. A and B. 8vo, London, 1834.

Backer, A. and A. de. Bibliothèque des écrivains de la compagnie de Jésus. 6 vols. royal 8vo, Liége, 1853 *et seq.*

Bérard, A. S. L. Essai bibliographique sur les éditions des Elzevirs. 8vo, Paris, 1822.

Blaze, F. H. J. Bibliographie musicale de la France et de l'étranger. 8vo, Paris, 1821.

Bridgeman, R. W. Short View of Legal Bibliography. 8vo, London, 1809.

Camus, A. G. Profession d'avocat. 5th ed., 2 vols. 8vo, Paris, 1832.

An excellent work on jurisprudence and its older bibliography.

CLARKE, A. and J. B. B. A Concise View of the Succession of Sacred Literature. 2 vols. 8vo, London, 1830–'32.

DARLING, J. Cyclopædia Bibliographica: A Library Manual of Theological and General Literature. 2 vols. royal 8vo, London, 1854–'9.

DE MORGAN, A. Arithmetical Books, from the Invention of Printing to the Present Time. Post 8vo, London, 1847.

DUPIN, A. M. Manuel des étudiants en droit. 12mo, Paris, 1835.

DUPIN, A. M. Manuel du droit public ecclésiastique français. 12mo, Paris, 1844.

Containing bibliographical notices of works upon law, &c.

DUPLESSIS, P. A. G. Bibliographie parémiologique. (Bibliography of Proverbs.) 8vo, Paris, 1847.

DRYANDER, J. Catalogus Bibliothecæ Historico-Naturalis Josephi Banks. 5 vols. 8vo, London, 1796–1800.

The most complete catalogue of books on natural history ever published. The collection now belongs to the British museum.

ELLIS, H. Catalogue of Books on Angling. 8vo, London, 1811.

ELMES, J. General and Bibliographical Dictionary of the Fine Arts. 8vo, London, 1826.

ENGELMANN, W. Bibliotheca Philologica. (A list of Greek and Latin grammars, dictionaries, &c., published from 1750 to 1852.) 3d ed., 8vo, Leipsic, 1853. Also, Bibliotheca Mechanico-Technologica, 1 vol.; Bibliotheca Scriptorum Classicorum, 1 vol.; Medico-Chirurgica, 1 vol.; Œconomica, 1 vol.; Veterinaria, 1 vol.; Zoologica et Palæontologica, 1 vol.; Bibliothek der Forst- und Jagdwissenschaften, 1 vol.; Bibliothek der Handlungswissenschaft, 1 vol.; Bibliothek der neuern Sprachen, 1 vol.

FORBES, J. Manual of Select Medical Bibliography. Royal 8vo, London, 1835.

HORNE, T. H. Manual of Biblical Bibliography. 2d ed., 8vo, London, 1846.

HOFER, Dr. J. G. VON. Literatur der Kriegswissenschaft und Kriegsgeschichte. 12mo, Berlin, 1832–'40.

LALANDE, J. DE. Bibliographie astronomique. 4to, Paris, 1803.

M'CULLOCH, J. R. The Literature of Political Economy. 8vo, London, 1845.

MURHARD, F. W. A. Bibliotheca Mathematica. 5 vols. 8vo, Leipsic, 1797–1805.

Containing the literature of arithmetic, geometry, mechanics, optics, &c.

OETTINGER, E. M. Bibliographie biographique universelle. (Dictionary of works relative to the public and private life of celebrated personages.) 2 vols. 4to, Brussels, 1850–'54.

ORME, W. Bibliotheca Biblica: A Select List of Books on Sacred Literature, with notices, &c. 8vo, Edinburgh, 1824.

PERCHERON, A. Bibliographie entomologique. 2 vols. 8vo, Paris, 1837.

PLOUCQUET, W. G. Literatura Medica Digesta. 4 vols. royal 4to, Tübingen, 1808–'9.

POOLE, W. F. An Index to Periodical Literature. 8vo, New York, 1853.

An exceedingly useful book, being a complete key to the contents of 1,500 volumes of standard American and English periodicals.

ROY, C. H. A. Catalogus Bibliothecæ Medicæ. 5 vols. 8vo, Amsterdam, 1830.

TERNAUX-COMPANS, H. Bibliothèque asiatique et africaine. 2 parts, 8vo, Paris, 1841–'2.

WALCH, J. G. Bibliotheca Theologica Selecta. 4 vols. 8vo, Jena, 1757–'65.

WALCH, J. G. Bibliotheca Patristica, Litterariis Annotationibus instructa. New ed., 8vo, Jena, 1834.

National bibliographies (catalogues of works in the literature of a single nation) are very numerous. Of these also we can only give some of the most useful.

1. America.

ASHER, G. M. Bibliographical and Historical Essay on the Dutch Books and Pamphlets relating to New Netherland. 6 pts. small 4to, Amsterdam, 1855.

ASPINWALL, J. Bibliotheca Americæ Septentrionalis. 8vo, Paris, 1820.

BIBLIOGRAPHICAL CATALOGUE of Books, Translations of the Scriptures, and other Publications in the Indian Tongues of the United States. 8vo, Washington, 1849.

BIBLIOTHECA AMERICANA; or, a Chronological Catalogue of the most curious and interesting Books, Pamphlets, &c., upon North and South America. 4to, London, 1789.

DALRYMPLE, A. Catalogue of Authors who have written on the Rio de la Plata, &c. 4to, London, 1807.

FARIBAULT, B. G. Catalogue des ouvrages sur l'histoire de l'Amérique. (Especially pertaining to those parts of America formerly in the possession of the French.) 3 pts. 8vo, Quebec, 1837.

KENNET, W. Bibliothecæ Americanæ Primordia. 4to, London, 1713.

LUDEWIG, H. E. The Literature of American Local History; a Bibliographical Essay. 8vo, New York, 1846.

MEUSEL, J. G. Bibliotheca Historica. Vols. 3 and 10.

Full title previously given.

RICH, O. A Catalogue of Books relating principally to America, arranged under the years in which they were printed, from 1500 to 1700. 8vo, London, 1832.

Containing 486 articles.

RICH, O. Bibliotheca Americana Nova, since 1700. 8vo, London, 1835.

RICH, O. Supplement. 1701–1800. 8vo, London, 1841.

The Bibliotheca and Supplement contain 2,523 articles.

RICH, O. Bibliotheca Americana Nova. 1801–'44 (with an index). 8vo, London, 1846.

TERNAUX-COMPANS, H. Bibliothèque américaine. 8vo, Paris, 1836.

Contains the titles of 1,153 works published previous to the year 1700.

TRÜBNER, N. Bibliographical Guide to American Literature. 12mo, London, 1856.

WARDEN, D. B. Bibliotheca Americana; being a Choice Collection of American Books, &c. 8vo, Paris, 1840.

2. Great Britain.

ANDERSON, C. Annals of the English Bible. (Containing a list of the various editions, &c.) 2 vols. 8vo, London, 1845.

BELOE, WILLIAM. Anecdotes of Literature and Scarce Books. 8vo, London, 1807–'12.

BOHN, J. Catalogue of an Extensive Collection of English Books. 8vo, London, 1829.

BRYDGES, S. E. Censura Literaria; containing Titles, Abstracts, and Opinions of old English Books. 10 vols. 8vo, London, 1816.

BRYDGES, S. E. The British Bibliographer. 4 vols. 8vo, London, 1810–'14.

BRYDGES, S. E. Restituta; or, Titles, Extracts, and Characters of Old Books in English Literature, revised. 4 vols. 8vo, London, 1814–'16.

COLLIER, J. P. Bibliographical and Critical Account of the Rarest Books in the English Language. 2 vols., London, 1865; 4 vols., New York, 1866.

COTTON, H. Editions of the Bible and Parts thereof in English. 2d ed., 8vo, Oxford, 1852.

GRIFFITH, A. F. Bibliotheca Anglo-Poetica; or, a Descriptive Catalogue of a rare and rich Collection of Early English Poetry. 8vo, London, 1815.

HAZLITT, W. C. Hand Book to the Popular, Poetical, and Dramatic Literature of Great Britain, from the Invention of Printing to the Restoration. 11 parts, 8vo, London, 1867.

HUME, A. The Learned Societies and Printing Clubs of the United Kingdom (with lists of their publications, &c.). 2d ed., post 8vo, London, 1853.

LOWNDES, W. T. The Bibliographer's Manual of English Literature. New ed., 6 vols. in 11 parts, Bohn, London, 1857–'64.

MACRAY, W. D. A Manual of British Historians to A. D. 1600. 8vo, London, 1845.

MARTIN, J. Bibliographical Catalogue of Books privately printed in England. 2 vols. imp. 8vo, London, 1834.

MOULE, T. Bibliotheca Heraldica Magnæ Britanniæ: An Analytical Catalogue of Books on Genealogy, Heraldry, Nobility, Knighthood, and Ceremonies. Royal 8vo, London, 1822.

REID, J. Bibliotheca Scoto-Celtica; or, an Account of all the Books which have been published in the Gaelic Language. 8vo, London, 1832.

SAVAGE, J. The Librarian; being an Account of Scarce, Valuable, and Useful English Books. 3 vols. 8vo, London, 1809–'12.

SMITH, J. R. A Bibliographical List of all Works illustrating the Provincial Dialects of England. 8vo, London, 1846.

STEVENS, H. Catalogue of my English Library. Post 8vo, London, 1853.

Giving a select list of 5,751 volumes.

UPCOTT, W. Bibliography of Works on British Topography. 3 vols. 8vo. London, 1818.

WALPOLE, H. Catalogue of Royal and Noble Authors of England; enlarged by Park. 5 vols. 8vo, London, 1806.

WRIGHT, T. Biographia Britannica Literaria. Anglo-Saxon and Norman Periods. (With lists of works, &c.) 2 vols. 8vo, London, 1842–'6.

WATT, R. Bibliotheca Britannica; or, a General Index of British and Foreign Literature. 4 vols. 4to, Edinburgh, 1820.

Vols. i. and ii., alphabetical; vols. iii. and iv., index.

3. France.

Asselineau, C. Bibliographie romantique. (Anecdotic catalogue of standard modern French romance.) 8vo, Paris, 1867; revised and enlarged ed., 1872.

Bossange, H. Ma bibliothèque française. Post 8vo, Paris, 1855.

Giving a select list of about 7,000 volumes of the best editions of standard French authors. Bossange also published in 1845 a large octavo volume of foreign books, mostly French, arranged according to subjects, with prices, a general index, &c. He has since published two supplements.

Desessarts, N. L. Les siècles littéraires de la France. (Bibliographical dictionary of French writers to the end of the 18th century, with supplements.) 7 vols. 8vo, Paris, 1800–'3.

Dictionnaire biographique et bibliographique des prédicateurs et sermonnaires français, par l'Abbé de la P. 8vo, Paris, 1824.

Girault de Saint-Fargeau, A. Bibliographie historique et topographique de la France. 4to, Paris, 1845.

Gonan, P. M. Bibliographie historique de la ville de Lyon pendant la révolution française. 8vo, Lyons, 1845.

Lelong, J. Bibliothèque historique de la France. 5 vols. folio, Paris, 1768–'78.

Containing 50,000 articles, 9 indexes, and a table of anonymous authors.

Lorenz, O. Catalogue général de la librairie française. 1840–'65. 4 vols., Paris, 1871.

Quérard, J. M. La France littéraire, ou Dictionnaire bibliographique, &c. (18th and 19th centuries.) 12 vols. 8vo, Paris, 1827–'64.

Quérard, J. M. La littérature française contemporaine, 1827–'49. (Commenced by Quérard, and continued by others.) 6 vols. 8vo, Paris, 1842–'57.

Quérard, J. M. Les supercheries littéraires dévoilées, Galeries des auteurs apocryphes, supposés, déguisés, &c., de la littérature française. 4 vols. 8vo, Paris, 1847–'52.

Brunet's *Manuel du libraire*, before mentioned, although a general work, is very rich in French bibliography.

4. Germany.

Asher, A. A Bibliographical Essay on the Scriptores Rerum Germanicarum. 4to, London and Berlin, 1843.

Buckner, R. Bibliographisches Handbuch der deutschen dramatischen Literatur. 4to, Berlin, 1837.

Engelmann, W. Bibliotheca Geographica. 2 vols. 8vo, Leipsic, 1858.

A classified catalogue of all the works on geography and travels published in Germany, from the middle of the 14th century down to 1856, with prices, index, &c.

Engelmann, W. Bibliothek der schönen Wissenschaften. (A list of German romances, plays, and poems, published from 1750 to 1845.) 2 vols. 8vo, Leipsic, 1837–'46.

Ersch, J. S. Handbuch der deutschen Literatur. 2d ed., 4 vols. 8vo, Leipsic, 1822–'45.

A classed catalogue of all the books published in Germany from the middle of the 18th century.

Heinsius, W. Allgemeines Bücherlexikon. (With five supplements.) 18 vols. 4to, Leipsic, 1812–'49.

An alphabetical catalogue of all the books published in Germany, from 1700 to 1848, with sizes, prices, and publishers' names.

Julius, N. H. Bibliotheca Germano-Glottica. 8vo, Hamburg, 1817.

Kayser, C. G. Vollständiges Bücher-Lexikon, &c. (With three supplements.) 13 vols. 4to, Leipsic, 1834–'53.

An alphabetical catalogue, like that of Heinsius, of all books, &c., published from 1700 to 1852.

Schwab, G. Wegweiser durch die Literatur der Deutschen. Ein Handbuch für Laien. Herausgegeben von Gustav Schwab und Karl Klüpfel. 2d ed., 8vo, Leipsic, 1847.

An indispensable guide in the formation of a select German library.

Taylor, W. Historic Survey of German Poetry. 3 vols. 8vo, London, 1828–'30.

Thimm, F. L. J. The Literature of Germany, from its earliest period. (With bibliographical notes, &c.) 12mo, London, 1844.

Ebert's "General Bibliographical Dictionary," before mentioned, is especially rich in early German literature.

5. Italy.

Bibliografia, od elenco ragionato delle opere contenute nella collezione de' classici italiani. 8vo, Milan, 1814.

Bibliografia dei romanzi e poemi cavallereschi italiani. (By G. de' Conti Melzi.) 2d ed., 8vo, Milan, 1838.

Brydges, S. E. Res Literariæ, bibliographical and critical. (Principally upon Italian literature.) 3 vols. 8vo, Naples, Rome, and Geneva, 1821–'2.

Cantù, I. L'Italia scientifica contemporanea. 8vo, Milan, 1844.

Fontanini, G. Biblioteca dell' eloquenza italiana, con le annotazioni del Signor Apostolo Zeno. 2 vols. 4to, Parma, 1803–'4.

An index to this last edition was published in 1811.

Gamba, B. Delle novelle italiane in prosa bibliografia. 2d ed., 8vo, Florence, 1835.

A detailed account of the works of the Italian novelists.

Gamba da Bassano, B. Serie dei testi di lingua. 4th ed. royal 8vo, Venice, 1839.

A general Italian bibliographical dictionary, with copious notes and indexes.

Haym, N. F. Biblioteca italiana, osia notizia de' libri rari italiani. New ed., 2 vols., 4to Milan, 1771–'2.

6. Spain, Portugal, and Northern Europe.

Antonio, N. Bibliotheca Hispana Vetus ad annum 1500. New ed., 2 vols. folio, Madrid, 1788.

Antonio, N. Bibliotheca Hispana Nova, ab anno 1500 ad annum 1684. New ed., 2 vols. folio, Madrid, 1783–'8.

Barbosa-Machado, D. Bibliotheca Lusitana Critica et Chronologica. 4 vols. folio, Lisbon, 1741–'59.

Bentkowski, F. Historya literatury polskiej. (History of Polish Literature, exhibited in a list of writings, &c.) 2 vols. 8vo, Warsaw and Wilna, 1814.

Bouterwek, F. History of Spanish and Portuguese Literature, translated by Ross. 2 vols. 8vo, London, 1823.

Casiri, M. Bibliotheca Arabico-Hispana Escurialensis. 2 vols. folio, Madrid, 1760–'70.

Castro, J. R. de. Biblioteca Española. 2 vols. folio, Madrid, 1781–'6.

Nyerup, R. Almindeligt Literaturlexicon for Danmark, &c. 2 vols. 4to, Copenhagen, 1820.

A universal literary lexicon of Denmark, Norway, and Iceland, giving an account of authors and their works.

Otto, F. History of Russian Literature, with a Lexicon of Russian Authors. 8vo, Oxford, 1839.

Recke und Napiersky. Allgemeines Schriftsteller und Gelehrten-Lexikon der Provinzen Livland, Esthland, und Kurland. 4 vols. thick 8vo, Mitau, 1827–'32.

Salvá, V. Catalogue of Spanish and Portuguese Books, with bibliographical remarks. 2 vols. 8vo, London, 1826–'7.

Warmholtz, C. G. Bibliotheca Historica Sueco-Gothica. 15 vols. 8vo, Stockholm, 1782–1817.

7. Miscellaneous.

Pagès, L. Bibliographie japonaise, ou catalogue des ouvrages relatifs au Japon. 4to, Paris, 1871.

Bibliotheca Hispano-Americana. 16mo, London, 1871.

In most of these countries periodical catalogues of all current publications, critical journals, weekly trade circulars, &c., have long been published, forming collectively valuable sources of information.

BIBLIOMANIA (Gr. *βιβλίον*, book, and *μανία*, madness), a term first introduced by Dr. Dibdin to denote a rage for possessing rare and curious books. The bibliomaniac proceeds according to certain principles, but, being a lover of books rather than of knowledge, attaches himself to accidental rather than essential qualities, and spends a fortune for works the contents of which he might obtain for a few dollars. The specialty which gives value to a book may be its age or rarity, the vicissitudes through which it has passed, or the fact of its having issued from a particular publishing house. It may be a handsome and peculiar binding, fanciful typography, the circumstance that it has belonged to some eminent personage, possessing perhaps an autograph or marginal notes, or that the purchaser desires it to swell a collection in some particular department of literature. Bibliomania originated in

Holland near the close of the 17th century, and passed thence into England, where it has held its principal seat, though it has more recently become to some extent a passion in France and in the United States. Numerous collections have been made of the editions of the Bible, of which the most complete is in the British museum, though rivalled by that of Mr. James Lenox of New York; of editions of the classics *in usum Delphini* and *cum notis variorum;* of first editions of the classics (*editiones principes*), and of many books which appeared in the infancy of typography (*incunabula*); of Bipont editions, and those cited by the academy della Crusca; of the "Republics" of the Elzevirs; and works printed by Aldus, Comino of Padua, Bodoni, Mattaire, Foulis, Barbou, and Baskerville. In France the jest books, burlesque treatises, and macaronic poems of the 16th century, which proceeded from the school of Merlin Coccaie and Rabelais, have been much sought after by bibliomaniacs. The bindings on which the highest prices are set in France are those of Derosne, Padeloup, Simier, and Thouvenin; and in England, those of Charles Lewis and Roger Payne. The most extraordinary prices are paid for splendid old editions, copies with a likeness of the author and painted initial letters, impressions upon parchment, morocco, paper furnished with a broad margin, or upon asbestus, printed with letters of gold or silver, or having all the text set in an impression of copper. The material is more highly esteemed if tinted rose color, blue, yellow, or green. The library of Lord Spencer, in England, contained an Æschylus of the Glasgow edition of 1795, the binding of which alone cost £16 7*s.* sterling. The binding of Macklin's Bible, in four volumes, cost 75 guineas; and that of Boydell's large edition of Shakespeare, in nine volumes, cost £132 sterling. The London bookseller Jeffrey had a volume of the "History of James II.," by Fox, bound in fox skin, in allusion to the name of the author; and the capricious bibliomaniac Askew is said to have pushed his madness even to having a book bound in human skin, that he might possess an entirely unique volume. The edges of books have sometimes been adorned with beautiful pictures. Books formerly were often bound in copper, silver, or gold leaf, and embellished with precious stones. It is not unfrequently a passion of men to obtain an extensive library in some particular department, or a complete set of the editions of some favorite author. Thus, Boulard spent a fortune in pursuit of the editions of Racine; a professor in a university is mentioned who passed his life in collecting obscene books; and Soleinne made a library of all the dramatic pieces that have ever appeared on any stage. He searched for new pieces with painful anxiety, purchasing a mass of books in languages which he could not read. A certain Frenchman purchased at exorbitant prices all astronomical books that he could find, though he did not understand a word of that science. Bibliomaniacs are the principal purchasers in the great antiquarian book auctions which are occasionally held in London and Paris. The Mazarin Bible, supposed to have been printed in 1455, was sold in 1827 for £504. A gentleman of New York has obtained a copy of this work at an expense of $2,500. Alcuin's MS. Bible, which was made for Charlemagne, was purchased by the British museum for £750. At the sale of Cardinal Loménie's library in Paris 3,300 livres were given for a copy of the *Grammatica Rhythmica*, in folio, printed in 1466 by Faust and Schöffer. A copy of Virgil, printed by Sweynheym and Pannartz in 1469, brought 4,101 livres. Dr. Dibdin mentions that 500 guineas were offered for a Livy printed by Vindelin de Spira in 1470, "a most extraordinary copy, bound in three volumes, in foreign coarse vellum." One of the most memorable competitions for bibliographic treasures occurred at the sale of the duke of Roxburgh's library, in London, in 1812. A copy of the first edition of the "Decameron," published by Valdarfer at Venice in 1471, was sold for the immense price of £2,260. An illuminated missal, executed for the duke of Bedford in the reign of Henry VI., was sold in 1786 for £203, in 1815 for £637, and in 1833 for £1,100. Eliot's Indian Bible sold in New York in 1857 for $200, and 18 numbers of Franklin's "Poor Richard's Almanack" for $12 per number. The most expensive single work in the United States is a copy of De Bry's "Voyages." The bibliomaniac forms the subject of the 13th chapter of the *Caractères* of La Bruyère, and Dr. Dibdin has published a volume entitled "Bibliomania, or Book-Madness."

BIBRA, Ernst von, baron, a German naturalist and author, born at Schwebheim, Bavaria, June 9, 1806. He studied law and afterward chemistry, and published several medical and chemical works, 1840–'48. He explored parts of Chili, Peru, and Brazil, and since his return from South America has resided in Nuremberg, where his scientific collections have acquired some celebrity. His works include *Vergleichende Untersuchungen über das Gehirn des Menschen und der Wirbelthiere* (1854); *Reisen in Südamerika* (2 vols., 1854); *Die narkotischen Genussmittel und der Mensch* (1855); *Erinnerungen aus Südamerika* (3 vols., 1861); *Aus Chile, Peru und Brasilien* (2 vols., 1862); and *Hoffnungen in Peru* (3 vols., 1864). He has also published novels and other writings, and in 1869 the first part of an archæological work.

BIBRACTE. See Autun.

BICÊTRE, a village of France, in the department of the Seine, near Sceaux, on the way from Fontainebleau to Paris, celebrated for its hospital; pop. (including inmates of the hospital) about 5,500. It derives its name from and occupies the site of a château built in 1290 by John, bishop of Winchester. A military hospital was founded here by Cardinal Richelieu in 1632. The inmates were afterward removed

to the Invalides, and Bicêtre became a hospital for the poor and an asylum for vagrants. Under Louis XVI. a part of it was set aside for the treatment of venereal diseases, the patients invariably receiving a flogging as the first step in the cure. During the massacres of September, 1792, the inmates defended themselves desperately against the terrorists, and a horrible slaughter ensued. The establishment now has departments for the following classes: 1, old servants of the hospital, able-bodied old men, and blind lads; 2, the sick generally; 3, old men not quite disabled, and men over 70 years of age; 4, blind old men, and those suffering under grave diseases; 5, incurable invalids, lunatics, idiots, and epileptics. About one half of the inmates are paupers; the majority of the rest are lunatics; the whole number of inmates is from 3,000 to 4,000, including about 600 employees with their families. Women are not received, and children are taken only when they are insane or epileptic; of these there are about 100. The annual expenses exceed 1,300,000 francs. The buildings include a gymnasium, library, church, and school, and workshops in which those who are able to labor are employed in woollen spinning, glass polishing, &c. About 200 lunatics are occupied in agricultural labor on a farm near the hospital.

BICHAT, Marie François Xavier, a French anatomist and physiologist, born at Thoirette-en-Bresse, department of the Ain, Nov. 11, 1771, died in Paris, July 22, 1802. He was a student of the Jesuit seminary of St. Irénée at Lyons until the revolution in 1789, when he returned home and began the study of anatomy under his father, a physician at Poncin, and afterward attended lectures at the hospital of Lyons. Driven from Lyons again by the revolution, he went in 1793 to Paris to study surgery under Desault at the Hôtel Dieu, who, pleased with his zeal and ability, invited him to reside in his own house, subsequently adopted him as his son, and destined him to be his successor. After the death of Desault (1795) Bichat arranged and published the works of his master, and opened a school of anatomy, physiology, and surgery. He also undertook a series of experiments on the chemical, physical, physiological, and vital properties of the different tissues of the animal economy. During a severe attack of illness, caused by overwork, he passed the time in maturing his views of anatomy and physiology, and sketched the plan of the works in which these views were afterward developed. As soon as he had partially recovered, he recommenced his labors. In spite of increasing weakness, he continued to pass several hours a day in a damp cellar, macerating animal tissues and making various experiments to ascertain the properties of each particular kind of structure in the organs of the body. In a short time he was seized with typhoid fever, which proved fatal in the course of 14 days. Although he had lived less than 31 years, he had done enough already to immortalize his name. He was the first who undertook a systematic analysis to reduce the complex structures of the body to their elementary tissues, and to ascertain the peculiar properties, chemical, physical, and vital, which characterize each simple tissue. The idea of such a work had been suggested by partial analyses before, but his *Anatomie générale* formed a new era in the development of that branch of science. The work abounds with minute and laborious research, extensive and elaborate experiment, conducted with intuitive insight and practical skill; and though a monument of fame, it was completed and published in a year. It was recognized at once and universally as the work of a great genius. Soon after its publication he commenced his *Anatomie descriptive*, conceived on a new plan; this was left unfinished, but was completed according to his directions by his friends and disciples. There was little systematic order in the study of anatomy and physiology before this time. Dissections were made chiefly with a view to the practical art of surgery alone, and not with any comprehensive view of general analysis. He first laid stress on the general distinction between conscious and unconscious life in the body, and the correspondingly incessant action of one set of organs, sleeping or waking, contrasted with the interrupted action of another set of organs, which are active in the waking state and passive during sleep. He divided the organism, therefore, into two distinct mechanisms which he called the organic and relational, or the vegetative and the animal. These distinctions are admitted at the present day, although the vegetative or the organic mechanism is more commonly subdivided into the nutritive and the reproductive systems. He fell into some errors by generalizing too extensively, without a sufficient knowledge of minor facts, and these errors have deterred his followers from pursuing the same course. His *Recherches sur la vie et la mort* contains the germs of a revolution in the study of anatomy and physiology, but its defective definitions and manifest errors have caused them to be overlooked. The same idea runs through all his works, and that is the distinction between conscious and unconscious bodily life and motion.

BICHE DE MAR. See Sea Cucumber.

BICKANEER, or Beykaneer. I. A native state of N. W. Hindostan, in Rajpootana, between lat. 27° 30′ and 29° 55′ N. and lon. 72° 30′ and 75° 40′ E.; area, 17,676 sq. m.; pop. about 540,000. Its length from E. to W. is 200 m., breadth about 160 m. The surface is flat, sandy, and arid, and the only products are various kinds of pulse, raised by irrigation. The only exports are horses and cattle of an inferior kind. The climate presents extraordinary extremes of temperature according as the sun is above or below the horizon. The Rajpoots are the predominant race, but the majority of the population are Jauts. Bickaneer was admitted under British protection in

1818. **II.** A fortified town, capital of the state, 240 m. W. by S. of Delhi; pop. about 60,000. It is situated in a desolate tract, and is surrounded by a wall 3½ m. in circumference, with numerous round towers and battlements. There are some elevated buildings and temples, and a citadel surrounded by a wall 30 ft. high, containing the residence of the rajah; but most of the dwellings are mere huts with mud walls painted red.

BICKERSTAFF, Isaac, a British dramatist, born in Ireland about 1735, supposed to have died on the continent late in the 18th or early in the 19th century. After having been one of the pages of Lord Chesterfield at the viceregal court of Dublin, he received a commission in the marines, in which service he was lieutenant when compelled to retire in disgrace. He wrote numerous comedies and comic operas, which were produced under Garrick's management, and were at one time very popular. His best known pieces are "The Maid of the Mill," "The Captive," "Love in a Village," "The Padlock," and the comedy of "The Hypocrite."

BICKERSTETH. I. Edward, an English clergyman, born at Kirkby Lonsdale, March 19, 1786, died at Watton, Feb. 24, 1850. He was for several years a post office clerk in London, till in 1812 he began business as a solicitor in Norwich. Here he became interested in religious and benevolent movements, and was ordained in 1815 as a deacon in the established church. He was sent in 1816 to Africa to reorganize the stations of the church missionary society, and during the next 15 years he was secretary and chief acting officer of that society. In 1830 he resigned this position and became rector of Watton, Hertfordshire. He belonged to the evangelical section of the established church. His most popular manual, "The Scripture Help," has been translated into French and other languages, and reached a sale of over 150,000 copies. A uniform edition of his principal works was published in 17 vols. in 1853, and there are 5 vols. more of his smaller publications. See "Memoir of the Rev. Edward Bickersteth," by T. R. Birks (2 vols., 1851). **II. Henry,** Lord Langdale, an English lawyer, brother of the preceding, born June 18, 1783, died at Tunbridge Wells, April 18, 1851. He served an apprenticeship to his father, who was a surgeon and apothecary, after which he travelled on the continent as medical attendant to the earl of Oxford, subsequently studied law, and rose to eminence in the courts of equity. He was appointed master of the rolls and raised to the peerage in 1836 as Lord Langdale. As he died childless, the title became extinct. His widow, sister of the earl of Oxford, was licensed in 1853 to assume her family name of Harley, and died Sept. 1, 1872. **III. Edward,** an English clergyman, nephew of the preceding, born at Acton, Suffolk, in 1814. After holding various ecclesiastical positions, he became in 1853 vicar of Aylesbury and archdeacon of Buckingham. In December, 1868, he was elected for the third time prolocutor at the convocation of Canterbury, and he is a member of the committee appointed for the revision of the New Testament. His charges at his different visitations between 1855 and 1870, as well as many of his sermons, have been published. **IV. Robert,** an English prelate, brother of the preceding, born at Acton, Aug. 24, 1816. He is a graduate of Queen's college, Cambridge, and has been successively curate at Sapcote (1841), at Reading (1843–'4), Clapham (1845), rector of St. Giles in the Fields (1851), and canon residentiary of Salisbury (1854). In 1856 he was appointed bishop of Ripon. His publications include "Bible Landmarks" (1850), "Lent Lectures, Means of Grace" (1851), "Sermons" (1 vol., 1866), and charges delivered to the clergy of his diocese. **V. Edward Henry,** an English clergyman and poet, son of Edward Bickersteth, rector of Watton, born in London, Jan. 25, 1825. He studied at Trinity college, Cambridge, and became curate at Birmingham in 1848, and at Tunbridge Wells in 1852. In the same year he was appointed rector of Hinton Martell, Dorsetshire; in 1855 vicar of Christchurch, Hampstead; and since 1861 he has been the private chaplain of his relative, the bishop of Ripon. His publications include "Poems" (1848); "The Rock of Ages" (1858); "Yesterday, To-day, and For Ever," a poem in 12 books (1866); and "The Two Brothers, and other Poems" (1871).

BIDASSOA, a river of Spain, 45 m. long, the last 12 m. forming the boundary between France and Spain. It rises in Navarre, and falls into the bay of Biscay near Fuenterrabia, watering the Bastan and other beautiful valleys. The river is locally called Bastan Zubi in the upper part of its course, the name of Bidassoa being generally applied to it only after its entrance into the valley of San Esteban. It has many small affluents. Near Irun, where the French had a tête-de-pont constructed in 1813, is the Pheasants' island, a sort of neutral ground, also called the Conference island from the many Franco-Spanish conferences held there. The treaty of the Pyrenees was negotiated at this place in 1659. The Spanish crossed the Bidassoa thrice in 1793, defeating the French, who in July were finally victorious. A French army of 16,000 men under Soult was defeated on the banks of the Bidassoa at San Marcial, Aug. 31, 1813, by 8,000 British and Spanish troops under Wellington. On Oct. 7 of the same year Wellington drove the French from their strong intrenchments at the same point.

BIDDEFORD, a city of York county, Maine, on the Saco river, at the falls, 6 m. from its mouth and opposite the town of Saco, with which it is connected by a bridge 500 ft. long; pop. in 1870, 10,285. The water power is excellent and inexhaustible, the fall being 42 feet. About a dozen cotton mills, situated on both

sides of the river, are worked by it; there are also extensive manufactories of woollen goods and hardware, iron founderies, and large saw mills, and the place has a large trade in lumber. The valuation of property in 1870 was $5,682,402; in 1860, $4,593,647. The city has two national banks, 2 savings banks, 1 Congregationalist, 1 Methodist, 2 Baptist, 1 Universalist, 1 Episcopal, and 2 Catholic churches, 34 schools, and 2 weekly newspapers. There are large fruit nurseries. The Portland, Saco, and Portsmouth railroad, passing through the city, connects it with Portland and Boston. The "Pool," near the mouth of the river, where there is a fine beach several miles in extent, is a place of summer resort. Biddeford was settled about 1630, and incorporated as a town in 1718, and as a city in 1855. It was named from Bideford, in England.

BIDDLE. I. Clement, an American soldier, born in Philadelphia, May 10, 1740, died there, July 14, 1814. He was a member of the society of Friends, a descendant of an early Quaker settler and proprietary of West Jersey, and was engaged in commercial pursuits. In 1764 he joined in raising a military corps for the protection of friendly Indians against a lawless band called the Paxton boys; and in 1775 he was an officer of the "Quaker" company of volunteers raised in Philadelphia. In 1776 he was appointed by congress deputy quartermaster general for the militia of Pennsylvania and New Jersey, and took part in the battle of Trenton, and in conjunction with another officer was ordered by Washington to receive the swords of the Hessian officers. He also participated in the victory of Princeton, the retreat at Brandywine, and the enterprise of Germantown. During the winter of 1777–'8 he shared the sufferings of the American army at Valley Forge, rendering important service especially during the famine. After the battle of Monmouth he retired from the army (September, 1780). In 1781 he was appointed at the urgent request of Greene quartermaster general of Pennsylvania. In 1794 he served against the whiskey insurgents. He was at the same time an active politician, urging the adoption of the state constitution of 1776, of which his brother Owen was one of the framers. After the organization of the federal government in 1787, he was appointed United States marshal of Pennsylvania. He was held in high regard by Washington, with whom he was in frequent intercourse and active correspondence. **II. Clement Cornell,** an American political economist, son of the preceding, born in Philadelphia, Oct. 24, 1784, died Aug. 21, 1855. He early entered the naval service, but soon left it and became a lawyer. The outrage upon the U. S. ship Chesapeake in June, 1807, led him to solicit military employment, and he was appointed captain of dragoons, but resigned his commission on the speedy settlement of this difficulty. In 1812 he raised a company of volunteers, called the "State Fencibles," and was afterward elected colonel of a volunteer regiment; but the retreat of the British from Baltimore left no opportunity for active service. After the restoration of peace he devoted himself chiefly to political economy, preparing notes and additions to the translation of Say's "Treatise on Political Economy" (2 vols., Boston, 1821; new ed., Philadelphia, 1851), which were commended by Dugald Stewart. In the free trade convention in Philadelphia in 1831 he bore a prominent part; and, although occupying no public position, he contributed to mould the policy of the government with regard to the currency and foreign commerce.

BIDDLE, James, an officer of the United States navy, born in Philadelphia in February, 1783, died there, Oct. 1, 1848. He entered the navy as midshipman in February, 1800. During the war with Tripoli he served on the Constellation and Philadelphia, was made prisoner, and detained until the conclusion of peace. When war was declared against Great Britain he sailed as lieutenant on board the Wasp, which soon captured the Frolic, and was put in command of the prize; but both vessels were soon after taken by the Poictiers, a British 74-gun ship, and carried to Bermuda. Having been exchanged (March, 1813), Biddle was placed in command of the gunboats on the Delaware, but was soon transferred to the Hornet, one of Decatur's squadron. He was for many months blockaded in the harbor of New London; but making his escape, he was assigned to the command of the Hornet, which was ordered to the East Indies; and in February, 1815, he was made captain. On March 23, off the island of Tristan d'Acunha, he captured the Penguin, being severely wounded in the action. For this he received a gold medal from congress, and was promoted to the rank of captain. After the war he held several important commands, including, in 1830–'32, that of the Mediterranean squadron, being also appointed a commissioner to negotiate a treaty with the Ottoman government.

BIDDLE, John, an English theologian, called "the father of English Unitarians," born at Wotton-under-Edge, Gloucestershire, in 1615, died in London, Sept. 22, 1662. He was the son of a tradesman, was educated at Oxford, and elected master of the free school of Gloucester. His tract entitled "Twelve Arguments drawn out of the Scripture, wherein the commonly received opinion touching the Deity of the Holy Spirit is clearly and fully refuted," led to his dismissal from this post and to his arrest (Dec. 2, 1645) and imprisonment, the house of commons ordering all printed copies of the book to be burned by the common hangman. While yet in prison he printed a "Confession of Faith concerning the Holy Trinity according to the Scriptures, with the Testimonies of several of the Fathers on this head" (London, 1648). This was followed by "The Testimonies of Irenæus, Justin Martyr, Novatianus, Theophilus, &c., concerning the Persons

of the Holy Trinity." The Presbyterians passed a measure through parliament, by which every one who denied the doctrine of the Trinity should be punished with death. This was aimed at Biddle, and he was about to suffer, when a sudden opposition arose to it among the Independents and the army. When the Independents gained the upper hand (1649), the penal laws against heretics were mitigated or repealed. Biddle was released, and retired into Staffordshire, where he was warmly welcomed by a magistrate, who procured him a congregation, made him a private chaplain, and left him a legacy. Bradshaw, president of the council, however, remanded him to prison. He had now lost not only his fortune and his liberty, but his friends. Dr. Gunning, afterward bishop of Ely, was the only theologian who visited him in prison. He suffered great privations, but his accurate knowledge of the Greek Scriptures induced Roger Daniel, a London printer, to give him for correction the proof-sheets of a Greek Septuagint, and this relieved his wants. In 1651 an act of indemnity and oblivion for all heretical offences was passed by parliament, and Biddle was again released, and collected around him those whom his writings had brought to his way of thinking. Their fundamental law was that "the unity of God is a unity of person as well as nature." The members of this new sect were called Biddellians, and, when their harmony with the doctrines of Socinus was perceived, Socinians. A translation of Biddle's "Twofold Scripture Catechisms" (London, 1654), for the use of foreigners, brought him again to the bar of the house of commons; and on his refusal to criminate himself, he was committed for contempt, and the death penalty ordinance was revived against him. When Cromwell dissolved the parliament, Biddle once more regained his liberty after 10 months' confinement. A whole Baptist congregation became converted to Biddle's views, and this was so displeasing to the Baptist minister, Mr. Griffin, that he challenged Biddle to a public controversy. The latter accepted the challenge, and spoke in a derogatory manner of Christ's divine nature. He was thrown into the Poultry Compter, July 3, 1655, and thence removed to Newgate, and tried for his life under the long parliament ordinance against blasphemy and heresy. As the case was evidently going against him, Cromwell interposed, the trial was stopped, and Biddle was remanded to jail. In order to shelter him yet more securely from his persecutors, Cromwell banished him to Star castle, in St. Mary's, one of the Scilly islands, with an annual subsistence of 100 crowns (October, 1655). Here he continued to devote himself to the study of theology. After three years he was released on a writ of *habeas corpus*, and returning to London, became pastor of an Independent congregation; but fearing the Presbyterians, who came again into power after the death of Cromwell, he retired into the country. Upon the final dissolution of the rump parliament, he again went to London and renewed his ministrations. The restoration of Charles II. once more caused him to retire from publicity; but he suddenly rejoined his congregation in 1662, while meeting in a private house. Biddle was fined £100, and each of the audience £20, with confinement in default of payment. The prison was kept in such a manner that five weeks' residence in it was enough to cause his death. Among his writings are a "History of the Unitarians" and several pieces translated from the works of the Polish Unitarians. He denied the doctrines of original sin and the atonement. The Rev. Joshua Toulmin, an English Unitarian minister, wrote a "Review of the Life, Character, and Writings of John Biddle" (1789).

BIDDLE, Nicholas, an American naval commander, born in Philadelphia, Sept. 10, 1750, killed at sea March 7, 1778. In 1765, on a voyage to the West Indies, he was left with two others on an uninhabited island, and lived there two months. In 1770 he entered the British navy. When Capt. Phipps, afterward Lord Mulgrave, was about to start on his exploring expedition, young Biddle, though a midshipman, deserted his own vessel and shipped as a seaman on the Carcass, serving through the cruise with Nelson, who was a mate of Phipps's vessel. On the commencement of the American revolution he returned to America, joined the colonists, and was made captain of the Andrew Doria, a brig of 14 guns and 130 men, in which he participated in Commodore Hopkins's attack on New Providence. After refitting in New London he was ordered on a cruise to the banks of Newfoundland, and in 1776 took among other prizes two transport ships with valuable cargoes and with a battalion of Highlanders. He was appointed to the command of the Randolph, a 32-gun frigate, in February, 1777, and speedily carried into Charleston four prizes. He was now made commander of a small fleet for a cruise in West Indian waters. In March, 1778, he was wounded in an action with the Yarmouth, an English ship. While under the hands of a surgeon, he was blown up with the explosion of the magazine, the 315 men on board the Randolph all perishing except four.

BIDDLE, Nicholas, an American banker, born in Philadelphia, Jan. 8, 1786, died there, Feb. 27, 1844. He was a son of Charles Biddle, vice president of Pennsylvania when Benjamin Franklin was the president, and nephew of Commodore Nicholas Biddle. He was a graduate of Princeton college, and became secretary of legation in Paris under Gen. Armstrong, and in London under Monroe. In 1807 he returned to Philadelphia, and commenced the practice of the law. He edited the "Port Folio" for a time in conjunction with Joseph Dennie, compiled a "Commercial Digest," and prepared the narrative of Lewis and Clarke's expedition. He was in the house of repre-

sentatives of Pennsylvania 1810–'11, and was distinguished by his efforts to establish a general system of education. Toward the close of the war of 1812–'15 he was a member of the state senate, and ardently supported the war. He wrote the report of the senate committee upon the propositions from the Hartford convention, which attracted great attention. In 1817 he was the candidate of the democratic party for congress, but was defeated by the federalists. In 1819 President Monroe appointed him a government director of the United States bank, and in 1823, on the resignation of Langdon Cheves, he became its president, retaining this place during the violent agitations concerning that institution under Gen. Jackson, till the termination of its charter in 1836. He was then chosen president of the newly established United States bank of Pennsylvania. In 1839, his health being much impaired, he resigned, leaving the bank apparently in a prosperous condition. Two years afterward it was declared insolvent, on which occasion he published a series of letters in vindication of his administration. He was an earnest promoter of public improvements, and exercised by his popular manners, force of character, and financial ability, a commanding influence. He was president of the trustees of Girard college. His speeches and writings are elegant and vigorous.

BIDDLE, Richard, an American lawyer and author, brother of the preceding, born in Philadelphia, March 25, 1796, died in Pittsburgh, July 7, 1847. He early became the leader of the Pittsburgh bar. In 1827 he visited England, and while there published a critical "Review of Capt. Basil Hall's Travels in North America" (1830), and "A Memoir of Sebastian Cabot, with a Review of the History of Maritime Discovery" (London and Philadelphia, 1831). He was a member of congress from 1837 to 1840.

BIDEFORD, a seaport town of Devonshire, England, on both sides of the Torridge, which is here crossed by a bridge of 24 arches and 677 ft. long, 35 m. N. W. of Exeter; pop. in 1871, 6,953. The town has a large mediæval church with interesting monuments, a fine quay 1,200 ft. long, and manufactures of ropes, sails, earthenware, and leather. It is healthful, and is a place of summer resort.

BIDLOO, Godfried, a Dutch anatomist, born in Amsterdam, March 12, 1649, died in Leyden in April, 1713. He was a surgeon in the army, professor at the Hague and at Leyden, and nearly eight years physician of William III. of England. Subsequently he returned to his chair at Leyden, teaching anatomy, surgery, and chemistry. His principal work, *Anatomia Humani Corporis* (Amsterdam, 1685; Utrecht, 1750), though inaccurate in some respects, was an important advance upon the science of the period. Cowper, the English anatomist, bought 300 copies of the plates of this work, and published them with alterations as his own at Oxford in 1693.

BIDPAY, or Pilpay, the reputed author of a collection of ancient Hindoo fables, which have been spread for 2,000 years throughout the East and the West, and have been translated into almost all languages. Eighteen of the fables of La Fontaine are copies or close imitations of them. Recent savants are of opinion that the author of the fables of Bidpay was a Brahman named Vishnu-Sarma, and that they originated from the ancient Hindoo collection *Pantchatantra* ("Five Sections"), of which an edition in Sanskrit has been published by Kosegarten (2 vols., Bonn, 1848–'59), and a German version by Benfey (2 vols., Leipsic, 1859). The same materials were subsequently worked up in the Sanskrit *Hitopadesa* ("Salutary Instruction"), of which an English translation by Wilkins, a Latin by Schlegel and Lassen, and a German by Max Müller have been published. The principal source of the numerous mediæval imitations was the Pehlevi version prepared for Chosroes I., and preserved in an Arabic translation of the 8th century.

BIEBRICH, or Bieberich, a town of Prussia, in the province of Hesse-Nassau, on the right bank of the Rhine, 3 m. S. of Wiesbaden; pop. in 1871, including Mosbach, 6,642. The palace of Biebrich, a fine modern building, though somewhat dilapidated, has long been the summer residence of the dukes of Nassau, several of whom are buried in the church here. The adjoining gardens are very pretty and extensive, and accessible to the public. They contain fine alleys, famous greenhouses, and a large fountain; and within their circuit is a miniature castle built on the ruins of the old castle of Mosbach, on the bank of a small artificial lake. Many Roman antiquities were removed to the castle from the former abbey of Ebersbach. S. E. of Biebrich, in the direction of Castel (opposite Mentz), are traces of a Roman fort. Cæsar in his second expedition against the Suevi, and Agrippa, are supposed by some authorities to have crossed the Rhine in this vicinity. Biebrich became a free port in 1831, and is accessible to steamers and large sailing vessels.

BIEFVE, Édouard de, a Belgian painter, born in Brussels, Dec. 4. 1808. He studied in Paris under David d'Angers, and on his return to Belgium excelled by his historical pictures and portraits. His "Compromise of the Brussels Nobles of Feb. 16, 1566," executed by order of his government, was much admired at the Paris exhibition of 1855, and is in the museum of Brussels. For the king of Prussia he painted "The Knights of the Teutonic Order recognizing the Elector of Brandenburg as their Grand Master." Among his other works are "The Introduction of Rubens to Charles V.," "Masaniello," "Ugolino," and "Raphael and La Fornarina."

BIEL. See Bienne.

BIELA, Wilhelm von, baron, a German soldier and astronomer, born at Rosla, near Nordhausen, March 19, 1782, died in Venice,

Feb. 18, 1856. He was an officer in the Austrian army, and retired with the rank of major. He discovered telescopic comets in 1823 and 1825, and acquired celebrity in 1826 by the discovery on Feb. 27, while stationed at Josephstadt, Bohemia, of a periodical comet visible every 6¾ years, and which is called after him. His most important contributions to astronomical science are contained in Schumacher's *Astronomische Nachrichten.*

BIELEFELD, a town of Prussia, in the Westphalian district of Minden, divided by the small river Dutter into an old and new town, 26 m. S. W. of Minden; pop. in 1871, 21,803. It is a celebrated centre of the flax and linen trade, the renowned Ravensburg flax manufactory having nearly 30,000 looms, including about 5,000 in the branch establishment at Wolfenbüttel. The bleacheries are after the Irish and Belgian systems, and produce annually over 150,000 pieces of linen and 50,000 cwt. of yarn. The ready-made linen factories here employed in 1870 over 2,000 women. There are also manufactories of silk, velvet, glass, machines, and other articles. Bielefeld became a Hanse town in 1270, and in the 17th century it passed with the county of Ravensberg into the possession of the house of Brandenburg. The neighboring castle of Sparrenburg on the Sparren mountain, formerly a bone of contention in times of war, is at present used as a prison.

BIELEV, a town of Russia, in the government of Tula, situated on the left bank of the Oka, about 155 m. S. S. W. of Moscow; pop. in 1867, 8,123. It has considerable trade, the chief articles of which are grain, hemp, and linseed oil. Two great fairs are annually held. The town has several tallow, oil, and rope factories, a sugar factory, 19 churches, and 3 monasteries. On May 16, 1826, the empress Elizabeth, widow of Alexander I., died here, and a monument to her memory has been erected. The house in which she died has been converted into a widows' home.

BIELGOROD. See Belgorod.

BIELITZ, a town of Austrian Silesia, on the N. W. declivity of the Carpathian mountains, and on the river Biala, opposite the Galician town of Biala, and 18 m. E. N. E. of Teschen; pop. in 1869, 10,721, chiefly Protestants. It is well built, contains a fine castle and park, and is the seat of a Protestant consistory with jurisdiction over Moravia and Austrian Silesia. It is the principal depot of Galician salt for Moravia and Silesia. Cloth and other articles are manufactured, and the dye works are renowned. The town dates from the 13th century. It was formerly part of the duchy of Teschen, and after having been for some time independent, the emperor Francis I. raised it in 1752 to a principality for Prince Alexander Joseph Sulkowski. The neighboring village of Old Bielitz has over 3,000 inhabitants.

BIELLA, a town of Italy, in the province of Novara, Piedmont, on the Cervo and Aurena, in a hilly neighborhood, 12 m. N. E. of Ivrea; pop. about 9,000. It is the seat of a bishopric, and has a fine cathedral with pictures by Cagliari, besides other churches, and a college. Its trade is active, and cloth, silk, linen, and paper are manufactured. The neighboring village of Oropa has a famous pilgrim church.

BIELOWSKI, August, a Polish writer, born at Krechowiec in Galicia in 1806. He studied at Lemberg, devoting himself especially to literature and history. After completing his student's course he pursued his literary studies in the same town, and after a time was made librarian of the Ossolinski library there. He published in 1830 a volume of poems and translations of Servian songs under the title *Haliczanin.* His other principal works are *Wyprawa Igora na Polowców* ("Igor's Expedition against the Polovtzi," Lemberg, 1833), and *Wystep krytyczny do dziejów Polski* ("Critical Introduction to the History of Poland," 1850). He is also the author of a Polish translation of Goethe's *Faust,* and of numerous articles in Polish periodicals.

BIELSHÖHLE, a cave in the Bielstein, one of the mountains of the Hartz, lying near the right bank of the Bode river, about 6 m. from Blankenburg, in Brunswick, northern Germany. It was discovered in 1762, and in 1768 a man named Becker arranged a passage or path by which it might be easily reached. The cavern is about 600 ft. in depth, and its entrance lies a little more than 100 ft. above the Bode. It contains 11 chambers, besides an upper cave, entered through the roof of the seventh division of the main portion. Stalactites of picturesque form and arrangement are the chief feature of interest in the cavern; in the eighth chamber their masses resemble an immense organ, and in the ninth the stalagmites take the form of waves. According to tradition, the forest god Biel, a divinity of the old Saxons, was once worshipped in the neighborhood of, if not in this cave; and a shrine near by contained his image, which the legend says was destroyed by St. Boniface.

BIELSKI, Marcin, a Polish historian, born at the family estate of Biala, near Sieradz, died there in 1576. He served in the army, and participated in 1530 in the battle of Obertyn. His *Kronika świata* (Cracow, 1550 and 1564), a universal history, and his *Kronika polska,* a history of Poland, brought down by his son Joachim to the year 1597 (Cracow, 1597; Warsaw, 1764), were the first historical works published in the Polish language. They were interdicted in 1617 by the bishop of Cracow on account of alleged heterodox statements.

BIENNE (Ger. *Biel*). **I.** A town of Switzerland, in the canton of Bern, pleasantly situated at the mouth of the valley of the Suze (Ger. *Schüss*), at the E. foot of the Jura, about 1 m. from the head of the lake of Bienne, 16 m. N. W. of Bern; pop. in 1870, 8,113, chiefly Protestants speaking the German language, although in neighboring villages a French patois

prevails. It is surrounded by walls and watch towers, and has an old castle used as a town hall, a fine parish church and gymnasium, and other public buildings. The town is especially noted for its manufactures of watches and of cotton prints, besides which cigars, leather, and other articles are made. Formerly under the jurisdiction of the see of Basel and involved in a protracted conflict with that bishopric, it fell to France in 1798, and in 1815 to the canton of Bern. **II. Lake of** (Ger. *Bielersee*), a sheet of water about 10 m. long and nearly 3 m. wide, commencing 3 m. N. of the lake of Neufchâtel, and extending along the Jura mountains. It is about 1,400 feet above the level of the sea, and abounds in fish at a depth of over 200 feet. It has for its only affluent a branch of the Suze or Schüss river, and receives the waters of the lake of Neufchâtel at its S. end through the Thiele, discharging them again at the N. E. end through the same river. One of the shores is dotted with villages and villas, while the other is rather desolate. Excellent wine is produced at the N. W. part of the lake between Neuveville and Bözingen. The scenery is attractive without being very striking, and the lake acquired celebrity through Rousseau, who resided for some time in 1765 on the island of St. Pierre, crowned by a grove of fine oaks, about 6 m. from the town of Bienne, and who gave a glowing description of it. His room is preserved nearly in the state in which he left it. On the S. E. shore of the lake is the most extensive peat moss of Switzerland, the peat being manufactured into petroleum, benzine, and pigments, in an establishment which was formerly known as the Gothic abbey of St. John. An ancient lacustrine village has been dug out recently from the morass.

BIENVILLE, a N. W. parish of Louisiana, bounded W. by Lake Bistineau, which communicates with Red river; area, 681 sq. m.; pop. in 1870, 10,636, of whom 5,047 were colored. It is traversed by Black Lake and Saline bayous, and intersected in its S. E. corner by Dugdemona river. The chief productions in 1870 were 192,164 bushels of Indian corn, 27,621 of sweet potatoes, and 7,253 bales of cotton. There were 1,313 horses, 2,786 milch cows, 5,912 other cattle, 4,340 sheep, and 12,485 swine Capital, Sparta.

BIENVILLE, Jean Baptiste Lemoine, sieur de, French governor of Louisiana, born in Montreal, Feb. 23, 1680, died in France in 1768. He was son of Charles Lemoine, and the third of four brothers (Iberville, Sauvolle, Bienville, and Châteaugay) who played important parts in the early history of Louisiana. Bienville while a lad was severely wounded in a naval action off the coast of New England, in which the French ship Pelican, 42 guns, commanded by Iberville, successfully encountered three English vessels, each of fully equal power with his own. In 1698 Iberville set out from France to found a colony at the mouth of the Mississippi, taking with him his brothers Sauvolle and Bienville. The first settlement was made at Biloxi, where Sauvolle was left in command, while Bienville was engaged in exploring the surrounding country. Iberville, who had returned to France, came back with a commission appointing Sauvolle governor of Louisiana. In 1700 Bienville constructed a fort 54 miles above the mouth of the river. Sauvolle died in 1701, and Bienville succeeded to the direction of the colony, the seat of which was transferred to Mobile. In 1704 he was joined by his brother Châteaugay, who brought from Canada 17 settlers. A ship from France brought 20 females, who had been sent out to be married to the settlers at Mobile. Iberville soon after died; troubles arose in the colony, Bienville was charged with various acts of misconduct, and in 1707 was dismissed from office; but his successor dying on the voyage from France, Bienville retained the command. Meanwhile, the attempt to cultivate the land by Indian labor having failed, Bienville proposed to the home government to send negroes from the Antilles to be exchanged for Indians, at the rate of three Indians for two negroes. In 1709 and 1710 the colony was reduced to famine. In 1712 the French king granted to Antoine Crozat the exclusive right to trade in Louisiana, and to introduce slaves from Africa. In 1713 Cadillac was sent out as governor, bringing with him a commission for Bienville as lieutenant governor. Quarrels arose between them, and the governor sent Bienville on an expedition to the Natchez tribe, hoping that he would lose his life. But Bienville succeeded in inducing the Natchez to build a fort for him, in which he left a garrison, and returned to Mobile. In 1717 Cadillac was superseded by Epinay, and Bienville received the decoration of the cross of St. Louis. Crozat surrendered his charter in 1717, and Law's Mississippi company was formed the same year, its first expedition arriving in 1718, with a commission for Bienville as governor. He now founded the city of New Orleans. War breaking out between France and Spain, Bienville took Pensacola, placing Châteaugay in command. In 1723 the seat of government was transferred to New Orleans. The next year Bienville was summoned to France, to answer charges which had been brought against him. He left a code regulating the condition of the slaves, banishing the Jews, and prohibiting every religion except the Roman Catholic. In 1726 he was removed from office, and Châteaugay was also displaced as lieutenant governor, and ordered back to France. Bienville remained in France till 1733, when he was sent back to the colony as governor, with the rank of lieutenant general. In 1736, 1739, and 1740 he made unsuccessful expeditions against the Chickasaws, in consequence of which he was superseded, and in 1743 returned to France, where the remainder of his life was passed.

BIERNACKI, Aloizy Prosper, a Polish agricultural reformer, born near Kalisz in 1778, died in Paris in August, 1856. He devoted himself to scientific agriculture, and established on his estates a school of mutual instruction on the Lancasterian method. He improved the breed of sheep by introducing into Poland merinos of a superior quality, and to his indefatigable exertions Poland is greatly indebted for agricultural improvements. His estate, Sulislawice, near Kalisz, was the earliest model farm in Poland, established at his own cost, long before the existence of any other similar institution. He was one of the leaders of the constitutional party under Alexander I. and Nicholas, and during the revolution of 1830–'31 was for a short time minister of finance. After the suppression of the revolution he emigrated to Paris, where he lived in studious occupation till his death.—His elder brother Józef, also of high mental accomplishments, a fervent and devoted patriot, fought in the French revolutionary army in Italy against the Austrians and Russians, and after participating in the Polish revolution of 1830–'31, and in some subsequent movements, he died in 1836, a state prisoner in Russia.

BIERSTADT, Albert, an American artist, born in Düsseldorf, Germany, in 1829. When he was two years of age his family emigrated to Massachusetts, and finally settled in New Bedford, where his youth and early manhood were passed. He soon discovered a talent for drawing, and in 1851 began to paint in oils. Two years later he went to Europe and entered upon a course of study at Düsseldorf. For four years he labored assiduously at his art, spending the summer months in sketching tours in Germany and Switzerland, and passing one winter in Rome. In 1857 he returned to the United States, and in the succeeding spring accompanied Gen. Lander on his expedition to survey and construct a wagon route to the Pacific coast. From this and subsequent visits to the great plains and the Rocky mountains he obtained the materials for a series of large landscapes, on which his reputation as a painter mainly rests. They comprise "The Rocky Mountains—Lander's Peak" (which was exhibited in the United States and Europe, and received marked attention in the Paris exposition of 1867), "The Domes of the Yo-Semite," "Looking down the Yo-Semite," "Storm in the Rocky Mountains," "Laramie Peak," "Emigrants Crossing the Plains," and "Mount Hood," besides a number of smaller works. For several of the larger pictures he obtained very high prices for this class of works. They are effectively painted, and in many points recall the general style of the Düsseldorf school, though his works are executed with greater boldness. He has lately been on the Pacific coast, engaged upon new pictures relating to that region. In 1871 he was made a member of the academy of fine arts of St. Petersburg.

BIES-BOSCH, a marshy lake of the Netherlands, between the provinces of South Holland and North Brabant, comprising about 75 sq. m. It is very shallow and contains numerous islands. The Maas flows into it, and issues from it under the name of Holland's Diep. The lake was formed Nov. 18 and 19, 1421, by an inundation, which is said to have submerged 72 villages, drowning 100,000 people.

BIGAMY, the wilfully contracting a second marriage with knowledge that the first is still subsisting. If the first marriage was void or has been dissolved by the death of one party, or by a divorce from the bonds of matrimony, the offence is not committed; but a divorce from bed and board is no defence. By the English statute a person whose husband or wife shall have remained absent for seven years without being heard from is excused from the penalties of bigamy; and in some of the American states there are similar statutes. In prosecutions for bigamy strict proof of the marriages is required; they cannot be made out by reputation.

BIG BLACK RIVER, a river which rises in Choctaw county, Miss., and after a S. W. course of about 200 m. enters the Mississippi through two mouths, one of which is in Warren county, and the other in Claiborne county, at Grand Gulf. It is bordered throughout most of its course by rich cotton plantations.

BIG BONE LICK, a salt spring in Boone county, Ky., especially interesting to geologists and naturalists, on account of the deposits of fossil bones of the mastodon and several species of mammalia found there. The soil containing the deposit is dark-colored and marshy, generally overlaid with gravel, resting on blue clay.

BIGELOW, Erastus Brigham, an American inventor, born at West Boylston, Mass., in April, 1814. He was intended for a physician, but his father having failed in business, he was unable to pursue his studies, and turned his attention to mechanical inventions. Before he was 18 he had invented a hand loom for weaving suspender webbing, and another for making piping cord. In 1838 he obtained a patent for an automatic loom for weaving knotted counterpanes, and contracted to build three of the machines; but having seen some imported counterpanes which would supersede those to be produced by his loom, he consented to the cancelling of the contract, and in a few months invented a loom capable of producing the new fabric. In 1839 he entered into an agreement with the Lowell manufacturing company to construct a power loom for weaving two-ply ingrain carpets, heretofore woven exclusively by the hand loom, which could only produce 8 yards a day. Mr. Bigelow's first loom produced 10 or 12 yards a day, and it has since been greatly improved by the inventor. In the mean time he had invented a loom for weaving coach lace. In 1862 he proposed a scheme of uniform taxation throughout the United States, and published "The Tariff Question considered in regard to the Policy of England and the Interests of the United States."

He is the founder of the flourishing manufacturing village of Clinton, Worcester county, Mass., in which, besides other large manufacturing establishments, are the extensive works of the Bigelow carpet company.

BIGELOW, Jacob, M. D., LL. D., an American physician and writer, born in Sudbury, Mass., in 1787. He graduated at Harvard university in 1806, and commenced practice in Boston in 1810. He early became known as a skilful botanist, had an extensive correspondence with European botanists, and different plants were named for him by Sir J. E. Smith, in the supplement to "Rees's Cyclopædia," by Schrader in Germany, and De Candolle in France. He published *Florula Bostoniensis* (8vo, 1814; enlarged eds., 1824 and 1840), and "American Medical Botany" (3 vols. 8vo, 1817–'21). For more than 40 years he was an active practitioner of medicine in Boston; during half of this time he was a physician of the Massachusetts general hospital, and held the offices of professor of materia medica and of clinical medicine in Harvard university. He also for 10 years (1816–'27) delivered lectures on the application of science to the useful arts, at Cambridge, as Rumford professor; these were afterward published under the title of "Elements of Technology" (new ed., "The Useful Arts considered in connection with the Applications of Science," 2 vols. 12mo, 1840). He was one of the committee of five selected in 1820 to form the "American Pharmacopœia;" and the nomenclature of the materia medica afterward adopted by the British colleges, which substituted a single for a double word when practicable, is due in principle to him. He has published numerous medical essays and discourses, some of which are embodied in a volume entitled "Nature in Disease" 1854); one of these essays, "A Discourse on Self-Limited Diseases," delivered before the Massachusetts medical society in 1835, had unquestionably a great influence in modifying the practice of physicians at that time and since. He was the founder of Mt. Auburn cemetery, near Boston, the first establishment of the kind in the United States, and the model of those which have followed; the much admired stone tower, chapel, gate, and fence were all made after his designs. He has the reputation of an accomplished classical scholar, and has been an occasional contributor to the literary periodicals and reviews; he is an excellent humorous writer both in prose and verse, and a volume of poems, entitled "Eolopoesis," has been attributed to him. He was for many years the president of the Massachusetts medical society, and of the American academy of arts and sciences. In commemoration of his services, the trustees of the hospital in 1856 ordered his marble bust to be placed in the hall of that institution. Since his retirement from active practice he has given much thought to matters of education, and has been specially interested in technological schools, or such as are to give a technical or utilitarian education as contrasted with a classical or literary one. He has been a pioneer in the so-called "new education," which aims to employ the time and labor of the student in the pursuit of special technical branches of knowledge, without wasting his energy on classical or other subjects irrelevant to his special vocation. See an address delivered by him in 1865, before the Massachusetts institute of technology, "On the Limits of Education."

BIGELOW, John, an American journalist and author, born at Malden, Ulster county, N. Y., Nov. 25, 1817. He graduated at Union college in 1835, was admitted to the bar in New York city in 1839, became connected with journalism, and editor of Gregg's "Commerce of the Prairies" and other books of travel. In 1845 he was appointed one of the inspectors of the Sing Sing state prison, serving till 1848. In November, 1850, he became a partner with Mr. Bryant in the ownership of the "New York Evening Post," and was the managing editor of that journal till 1861, when, after the accession of President Lincoln, he went as United States consul to Paris. This office he retained till after the death of Mr. Dayton, whom he succeeded in 1865, as minister at the court of Napoleon III., where he remained till 1866. In 1869, after the death of Mr. Raymond, he was for a short time editor of the "New York Times," after which he went to reside in Berlin. His works include "Jamaica in 1850," "Life of Fremont" (1856), and *Les États-Unis d'Amérique en* 1863 (Paris). In 1868 he edited the autobiography of Franklin from materials collected in France; and in 1869 he published "Some Recollections of the late Antoine Pierre Berryer."

BIGELOW, Timothy, an American lawyer, born in Worcester, Mass., April 30, 1767, died May 18, 1821. He was the son of Col. Timothy Bigelow, who served in Arnold's expedition to Quebec. He graduated at Harvard college in 1786, and practised law at Groton, Mass., from 1789 to 1807, when he removed to Boston. He took an active part in politics as a firm federalist, was for 20 years a member of the state legislature, and 11 years speaker of the house of representatives, and a member of the Hartford convention. He stood at the head of his profession, and in the course of 32 years was supposed to have argued 10,000 causes.

BIG HORN. See SHEEP.

BIG HORN, the S. E. county of Montana territory, bounded E. by Dakota and S. by Wyoming territory; area, about 30,000 sq. m.; pop. in 1870, 38. It is intersected by Yellowstone river, and watered by its tributaries and by Mussel Shell river. Thick-Timbered river crosses the S. E. corner. There are mountains in the E. part. The Northern Pacific railroad will pass through the N. part.

BIG HORN RIVER, the largest tributary of the Yellowstone, rising in the Rocky mountains a little N. of Fremont's peak, in the N.

W. part of Wyoming territory, where it is known as Wind river. Pursuing first a S. E., then a N. course, for about 350 m., during which it receives several tributaries, it falls into the Yellowstone at Big Horn City, Montana territory.

BIG STONE, a S. W. county of Minnesota, chiefly bounded N. E. by the Minnesota river, which crosses the N. portion, and W. by Dakota territory and Big Stone lake, the main source of the Minnesota; area, about 1,700 sq. m.; pop. in 1870, 24. It is well watered by affluents of the Minnesota.

BIHAR, the largest county of Hungary, situated E. of the Theiss and W. of Transylvania, and traversed by the Swift and Black Körös and other rivers; area, 4,280 sq. m.; pop. in 1870, 557,337, chiefly Magyars and Wallachs. It is mountainous or hilly in its eastern portions, and level in the western, and generally fertile, producing grains, fruits, tobacco, and wines of good quality. It is rich in cattle, horses, and sheep. The principal towns are Gross-Wardein (Hun. *Nagy-Várad*), the capital, and Debreczin.

BIJANAGUR, or **Bisnagur,** a ruined city of southern India, on both sides of the Tumbuddra, here 800 yards wide, 30 m. N. W. of Bellary. The city stands in a plain surrounded by enormous masses of granite, and strewn with blocks of that material, with which the streets are paved. The remains of numerous temples and other buildings, all of granite, exhibit the purest style of Hindoo architecture. The portion of the city S. E. of the river is enclosed by walls or blocks, and is 8 m. in circuit. It contains a splendid temple dedicated to Mahadeva, surrounded by numerous cells for worshippers, with a pyramidal portico facing the east, which is 150 ft. high, and is divided into 10 stories. Many pilgrims resort to the annual festival. Near the centre of the city is another temple sacred to Wittoba, which consists of a group of buildings occupying a space of about 400 ft. by 200. The columns supporting the roof of the chief edifice are ornamented with figures of lions, and the ceiling is also sculptured. That portion of the city N. W. of the river, also known as Annagoondy, contains a temple sacred to Krishna. Bijanagur was built between 1336 and 1343, and was the metropolis of the Brahmanical kingdom of Bijayanagar. It was destroyed by the Mohammedan confederacy of the Deccan in 1564.

BIJAWUR, or **Bejour,** a state of Bundelcund, Hindostan, between lat. 24° 22′ and 25° N. and lon. 78° 58′ and 79° 50′ E.; area, about 900 sq. m.; pop. about 90,000. The state maintains a small military force, and has an annual revenue of about $125,000. Capital, Bijawur, a small town 23 m. S. of Chutterpore.

BILBAO, a city of Spain, capital of the Basque province of Biscay, 45 m. W. of St. Sebastian, on the Nervion, about 9 m. above its entrance

Bilbao.

into the sea at Portugalete; pop. about 18,700. It is a fine city, consisting of a new and an old town, connected by bridges, with rich convents, a number of churches, schools, and other public buildings. The corporation derives a large revenue from tolls on imports and the monopoly of beef. The abattoirs of the city are among the best in Spain. Rope, anchors, leather, hardware, paper, hats, tobacco, earthenware, and other articles are manufactured, and there are several ship yards. Not far from the city are the highly productive iron mines of Veneras. Bilbao is the

chief seaport of N. Spain, though only small craft can come up to the city, large ones landing goods at Olaveaga, 2 m. below. The registered shipping is between 500 and 600 vessels, and the fisheries are important. The annual value of imports exceeds $13,000,000. The exports of wool, once so important, have fallen off, owing to the preference given to Saxon wools; and the value of exports, consisting chiefly of wine, lead ore, zinc, iron, corn, and flour, has declined to about $1,000,000. The Bilbao and Tudela railway, completed in 1863, intersects at Miranda the North of Spain line, and places Bilbao in direct communication with Madrid and with France. There are steamers to Spanish, English, French, and Dutch ports. Bilbao was founded in 1300, was occupied by the French in the Napoleonic wars, and was bravely defended against the Carlist general Zumalacarreguy, who was mortally wounded here in 1835.—The province of Biscay is also called Bilbao. (See Biscay.)

BILBERRY, or **Blueberry,** the name of a shrub and its fruit, a species of *vaccinium*, or whortleberry. There are two kinds of this shrub: a

Bilberry (Vaccinium myrtillus).

taller and a dwarf variety. The fruit of the dwarf shrub in Europe, and that of the taller variety in Canada and the United States, are both called bilberry.

BILDERDIJK, Willem, a Dutch poet, born in Amsterdam, Sept. 7, 1756, died in Haarlem, Dec. 18, 1831. He was educated at Leyden, published in 1779 a volume of poems, consisting principally of imitations and translations of the Greek poets, and the next year gained a prize from the literary society of Leyden. He practised as an advocate at the Hague, attached himself to the house of Orange, and was obliged to emigrate when the French invaded Holland in 1795. He visited Germany, remaining two years at Brunswick, where he published various small pieces, a didactic poem on astronomy, and a translation of Voltaire's *Ce qui plaît aux dames.* He passed thence in 1800 to London, where he lectured upon literature and jurisprudence, and translated into Dutch many of the poems of Ossian. Returning to Amsterdam in 1806, he was appointed by Louis Bonaparte member and professor of the newly established institute of Holland; but upon the king's abdication in 1810 he lost the pension which the latter had given him, and retired to Haarlem. Though not as remarkable for his artistic taste as for his vigor of thought, his countrymen place him by the side of Schiller and Byron, and he is better known out of Holland than almost any other Dutch poet. Besides smaller poems, translations, and patriotic fragments, he left a number of tragedies, and an epic, "The Destruction of the First World" (*De ondergang der eerste wereld*, Amsterdam, 1820). His historical work on Holland, *Geschiedenis des vaterlands*, was edited after his death by Tijdemann (12 vols., Leyden, 1832–'9); and his complete poetical works (*Dichtwerken*) were published at Haarlem in 1857–'60, in 16 vols.—His second wife (1777–1830) wrote excellent poetry (*Dichtwerken*, 2 vols., 1859), besides tragedies. A translation of Southey's "Roderick" into Dutch verse (*Rodrigo de Goth*) is one of her finest productions.

BILE, the green and bitter liquid secreted by the liver. This liquid presents differences in the various classes of animals, although its principal characters are everywhere the same. Taken from the gall bladder, it is a mucous, viscous, somewhat transparent fluid, capable of being drawn out in threads of a green or brown color, of a bitter but not astringent taste, sometimes leaving a rather sweet after-taste, and of a peculiar odor, often having when warmed the smell of musk. It is usually weakly alkaline, often perfectly neutral, and only in disease, in rare cases, acid. It differs from other animal juices in long resisting putrefaction, when the mucus mixed with it has been taken away. The chemical composition of bile is still but little known, the best chemists being in complete disagreement in this respect. However, there are some points which seem to be decided. For instance, there is in bile a resinous substance, which is a combination of one or two acids with soda; there is a coloring principle (the biliverdine), a peculiar fatty matter, the cholesterine, and other fatty substances, salts, and water. According to Demarçay, the bile of oxen has the following composition:

Water	875
Choleate of soda	110
Coloring and fatty matters, mucus, &c.	5
Salts	10
	1,000

Demarçay admitted only one acid in bile, and he considered this liquid as a fluid soap, resulting from the combination of this acid (cholic acid) with soda. Strecker has found that the cholic acid of the French chemist is a complex one, and he has shown that it is composed of two acids, one of which he calls cholic and the

other choleic. According to the researches of Bensch and Strecker, the choleate of soda is the chief principle of bile, as regards its relative quantity, and also its importance. The choleic acid is a nitrogenized substance, containing sulphur in greater proportion than the other nitrogenized matters. As in the bile of most animals sulphur exists only in the choleic acid, and in the proportion of 6 per cent., it is possible to ascertain easily the quantity of this acid in any kind of bile. It has thus been found that almost the whole of the alcoholic extract of bile consists in choleic acid in the fox, the sheep, the dog, &c., while in the bile of the ox there is as much cholic as choleic acid. The salts formed by these two acids amount to at least 75 per cent. of the whole of the solid constituents of bile. Normal human bile contains, according to Frerichs, about 14 per cent. of solid constituents; but Lehmann justly remarks that the quantity of water, and consequently the proportion of solid constituents, may be as variable in bile as in most of the other secretions. Gorup-Besanez found 9·13 per cent. of solid constituents in the bile of an old man, and 17·19 per cent. in that of a child aged 12 years; but many more proofs are necessary to determine that bile is more aqueous in old age than in childhood. Lehmann says that the organic constituents of human bile amount to about 87 per cent. of the whole solid residue. The proportion of the other elements of bile, *i. e.*, bile pigment (biliverdine), cholesterine, fats, and mineral salts, has not yet been positively determined. The two special organic acids of bile can be decomposed into various substances. They both, when treated by alkalies, give origin to cholalic acid, and to dyslysine, but one of them (the cholic acid) produces also glycocoll, and the other (the choleic acid) taurine. When treated by powerful acids, cholic acid gives origin to choloïdic acid, glycocoll, and dyslysine, while choleic acid produces taurine, choloïdic acid, and dyslysine. Cholesterine and margaric and oleic acids are kept in solution in bile by the two principal organic acids of this secretion. The biliverdine, or the coloring principle of bile, is a substance resembling in its composition the hematosine or coloring principle of blood. It contains nitrogen and iron, as do all the organic coloring matters, according to M. Verdeil. The biliary sugar, or picromel, seems to be only a product of decomposition of some of the constituents of bile. The biline of Berzelius and Mulder seems to be a mixture of alkaline cholates and choleates.—The ancient physicians and physiologists used to consider the organ which secretes bile, the liver, as a most important one; but after Aselli, in 1622, had discovered the lymphatic vessels, a reaction took place against the importance attributed to the liver, and some physiologists went so far as to think that its share in the vital actions was almost null. In France the researches of many physiologists, and particularly of Prof. Bernard, have shown that the liver is one of our most important organs, and recent experiments have proved that bile is a very useful secretion, if not an essential one. Schwann opened the abdomen and the gall bladder in many dogs, and succeeded in forming a biliary fistula, after having tied the bile duct. Nine of these animals very quickly died; six lived 7, 13, 17, 25, 64, and 80 days; two only survived definitively, but in them a new bile canal was formed. Of the six dogs that lived from 7 to 80 days, four seemed to die starved, having lost their fat. The two others after a few days began to regain their fat, and reached their initial weight up to a certain time, when they became again emaciated and finally died. Blondlot has seen a dog living five years after the occlusion of the bile duct, and the formation of a biliary fistula, through which the bile flowed out. During this long period the health of the animal was usually very good. More recently Schwann has repeated his experiments on 20 dogs, out of which only two survived, one four months, and another a year. Nasse kept a dog alive five months with a biliary fistula. Its appetite was good, and it ate about double the quantity of meat that a healthy dog of the same size would have taken, and nevertheless it died almost completely deprived of fat. It results from very careful experiments of Bidder and Schmidt, and of their pupil Schellbach, that the cause of death, when bile is not allowed to flow into the bowels and passes out of the body, is that the animal has a great difficulty in repairing the loss of fat and of nitrogenized substances which go out with the bile. In a dog operated upon by these physiologists, the quantity of food taken was much greater than before the operation, and the consequence was that the animal did not lose his forces and remained fat, though less so than before. Prof. Bernard, according to Dr. Porchat, has ascertained that if adult dogs may live many months when bile flows out of their body by a biliary fistula, it is not so with young dogs, in which death always occurs quickly in such circumstances. Some facts observed in men (in children by Dr. Porchat, in adults by Dr. Budd) seem to prove also that adults may live much longer than children when there is no bile passing into the bowels. It seems very probable that bile is not absolutely necessary to digestion, as some animals have lived a long while without bile; but even in these cases there is room for doubt. For instance, Blondlot's dog was not prevented licking its wound, and probably swallowed a little bile, as Schwann has seen his dogs doing; and Bidder and Schellbach, we cannot understand why, at times gave pieces of liver (containing bile) as food to the one of their dogs that was the least affected by the operation. We may sum up thus: 1. Bile has not yet been positively proved not to be absolutely necessary to digestion and to life. 2. It seems probable, however, that its function is not absolutely essen-

tial. 3. When bile is missing in the bowels (and flowing out of the body by a fistula), the principal cause of death is the loss of fat and of albuminous matters. We will add to this last conclusion that, according to Dr. Brown-Séquard, it would be very important to repeat the experiments of Blondlot, Bidder, and others, in trying to repair by food the loss of certain materials of the body which go out with bile, and which are not present in sufficient amount in meat and bread. Among these materials sulphur is the principal, and it would be easy to give a great deal of it by feeding the animals upon eggs and other kinds of food which contain more sulphur than meat and bread. This view of Dr. Brown-Séquard is grounded not only on the fact that bile flowing out of the body takes away a great quantity of sulphur and other principles, but also that when bile passes freely into the bowels, its elements, and particularly soda and sulphur, according to Liebig, are absorbed.—A question which is intimately connected with that we have examined already concerning the importance of bile, is whether this liquid is to be considered as an excrement or as a useful secretion. It appears to be certain that some, at least, of the principles of bile are absorbed in the bowels, if not most of them, as Liebig thought, and that therefore bile cannot be said to be entirely an excrement. However, some of the compound constituents of bile are transformed in the bowels, as Mulder and Frerichs have shown, and they are expelled with the fecal matters. We are consequently led to conclude that bile is only partly an excrement, if it is so at all. We say if it is so, because the part of it which is expelled with the fecal matters may have some use before being expelled.—The fact that there is a very great quantity of bile secreted in a day throws some light on the question of its reabsorption. Blondlot says that a dog of a medium size secretes from 40 to 50 grammes (nearly 1½ ounce) a day. Nasse and Platner speak of 200 grammes (6½ ounces) as the secretion of bile in a dog weighing 10 kilogrammes (22 lbs.), which gives a proportion of 1 to 50. Bidder and Schmidt have found that the quantity of bile varies extremely with the species of the animal experimented upon. While for each 2 pounds of the body of a cat there is a secretion of 14 grammes (½ ounce) of bile in a day, in the dog there is almost 20 grammes (⅔ ounce), in the sheep 25½ grammes (⅚ ounce), and in the rabbit the enormous quantity of 136 grammes (4½ ounces). In weighing the solid residue of the fecal matters of a dog for many days, and comparing the result obtained in so doing to the weight of the solid residue of bile during the same time, Bidder and Schmidt have found that the two quantities were nearly alike, so that necessarily a good part of the principles of bile is absorbed in the bowels. They have also ascertained that almost all the sulphur of the bile is absorbed. They think that only a small quantity of bile, transformed into an insoluble substance (dyslysine), remains unabsorbed and goes out with the excrements.—Sylvius de la Boë, and afterward Boerhaave, imagined that bile is employed to neutralize the product of gastric digestion, chyme, which is very acid. This view has been considered quite wrong by almost every one, but Lehmann justly remarks that there is some truth in it, and he affirms that bile certainly contributes to the neutralization of the free acids of chyme. Bile no doubt acts as a solvent of fat, at least by one of its constituents, the choleate of soda, as has been shown by Strecker, although Bidder and Schmidt have found no difference in the quantity of fat absorbed, whether the bowels contained bile or not. But their mode of deciding this question is open to many objections. It has been said that bile prevents putrefaction taking place in chyme, or at least in fecal matters. Most of the recent experimenters agree with Tiedemann and Gmelin in admitting this influence of bile. Dr. Porchat has observed, in children in whom bile could not pass into the bowels on account of the occlusion of the bile duct, that the fecal matters were putrefied, as Bidder and Schmidt, Frerichs, and others, have observed in animals in which they had tied this duct. However, it seems that in some cases the absence of bile is not sufficient to allow putrefaction to take place in the fecal matters, as Blondlot says that he has observed no difference between these matters in dogs in good health and in those operated upon. The water contained in bile helps in the dissolution of certain elements of chyme, and in so doing renders their absorption more easy.—Bile acts as an excitant on the mucous membrane of the bowels, to produce reflex contractions, favoring in this way the propulsion of food and of fecal matters. According to Schiff, bile produces contractions in the intestinal villi. It is said also that bile increases the secretion of the intestinal mucus, and prevents constipation. All these views may be partly true, but it is certain that without bile the expulsion of fecal matters takes place regularly.—Many physiologists think that bile, like most of the secretions, contains some effete matters which cannot be of any use in the blood, or which might be deleterious. In opposition to the views of those who admit that the secretion of bile is for the purpose of purifying the blood, and who still regard this liquid merely as an effete carbonaceous matter which the respiration has not removed, Lehmann says that the bile—a secretion by no means poor in nitrogen and hydrogen—is not separated in any increased quantity when the process of oxidation in the lungs happens to be disturbed; that there are no pathologico-anatomical facts which favor the view that the liver can act vicariously for the lungs; and, lastly, that the separation of carbon by the liver, as compared with that by the lungs, is so trifling, as shown by Bidder and Schmidt, that the liver can hardly

be regarded as essentially a blood-purifying organ, in so far as the elimination of carbon is concerned. However, it is certain that when bile is not excreted freely in man, jaundice, and frequently certain nervous disturbances, are produced, and these phenomena must be attributed to the action of some of its principles. But three explanations may be given concerning the production of these phenomena, and we do not yet positively know which is the best. In the first place, it may be that the principles of bile preëxist in the blood, and that when they are not secreted, their quantity increasing, they produce the deleterious influence which sometimes results in jaundice; in the second place, they may be secreted, and, in consequence of some obstruction of the bile duct, they may be absorbed, and then produce their ill effects; in the third place, they may be changed into toxical substances either in the blood or in the liver or the biliary ducts. As regards the first of these views, Lehmann has tried to prove, on good grounds, that the secretion of bile is not, like the urinary secretion, a mere separation of certain principles from the blood; and therefore we may conclude that it is not probable that bile, even if it contains toxical substances, results from a depuration of the blood. If we admit the second view, that the liver produces most of the principles of bile, and that these principles are absorbed in cases of jaundice, we find that we cannot explain the toxical phenomena which then sometimes take place, because they are not constant, and they exist in cases where jaundice is or is not very considerable, while they may not appear in cases of deep jaundice. Dr. Budd has been led to the third view above stated, which is that poisonous substances are formed in the blood from the principles of bile. The function of depuration of the blood, attributed to the liver, seems therefore to be of much less importance than some persons have thought. Dr. Budd relates several cases in which the passage of bile into the bowels was entirely prevented by the complete closure of the bile duct, and in which, nevertheless, life was prolonged for many months. We must say, however, that the secretion of substances which may, when they are absorbed, and when they accumulate in the blood, be transformed into a poison, ought in some respects to be considered as a depuration.—It has been a much debated question whether bile is secreted from the blood of the portal vein or that of the hepatic artery. Experiments on animals and pathological facts have been mentioned in favor of both these opinions. When a ligature is placed on the portal vein, bile not only continues to be secreted, but the other functions of the liver also continue; but this fact, as Brown-Séquard remarks, cannot prove that the blood of the portal vein is not necessary for these functions, as this blood after the ligature passes into the vena cava, and afterward into the arterial circulation, and therefore into the liver, by the hepatic artery. It seems very probable, indeed, from the great quantity of bile produced in a day, that the portal blood, if not the only source of the secretion of bile, is at least employed in a great measure for this secretion.

BILED-UL-JERID. See Beled-ul-Jerid.

BILFINGER, or Bülffinger, Georg Bernhard, a German philosopher, born in Cannstadt, Jan. 23, 1693, died in Stuttgart, Feb. 18, 1750. The name of the family proceeds from the hereditary possession of a sixth finger and toe, which in his instance were removed by an operation. A disciple of Wolf and Leibnitz, he was appointed by Peter the Great professor of philosophy at St. Petersburg. He won a prize there for his improved system of fortification, and another from the French academy for his memoir *Sur la cause de la pesanteur des corps.* Afterward he became a professor of theology at Tübingen, and was appointed privy councillor of Würtemberg, in which office he devoted himself especially to education, commerce, and agriculture. Prominent among his many works are *Elementa Physices* (Leipsic, 1742) and *Nouveau système de fortification* (Stuttgart, 1734).

BILGUER, Paul Rudolf von, a German chess player, born at Ludwigslust, Sept. 21, 1815, died in Berlin in September, 1840. He was a lieutenant in the Prussian army, and retired on account of his health. In 1840 at Berlin he played three games at once with as many different opponents, conducting two of the contests without seeing the boards and men. His *Handbuch des Schachspiels* (Berlin, 1843), completed and published after his death by his friend Von Heydebrand von der Lasa (4th ed., Leipsic, 1864), is still the best practical work on that game.

BILIARY DUCTS, small ducts through which the bile flows from the liver and the gall bladder to the duodenum. The main biliary duct, which leads directly from the liver to the duodenum, gives off a branch which leads into the gall bladder, in which the gall is collected. This branch is called the cystic duct, and that part of the bile duct which leads from the liver to the junction with the cystic duct is called the hepatic duct; while the rest of the bile duct, leading from this point of junction to the duodenum, is called the *ductus communis choledochus.* This is about the size of a goose quill, and three inches long. It terminates in the descending portion of the duodenum, about four inches from the pyloric extremity of the stomach.

BILIN, a town of Bohemia, on the Bila, 42 m. N. W. of Prague; pop. in 1869, 3,620. It has two castles, and manufactories of magnesia, beet-root sugar, cloth, and earthen flasks. It is chiefly noted for its mineral springs (alkaline), four in number. The water is clear, has a sourish taste, and a temperature of 59°–66° F. The springs are not much resorted to, but from 80,000 to 100,000 flasks of the water are

yearly sent to the other Bohemian watering places.

BILIOUS FEVER, a term heretofore applied to cases of intermittent and remittent fever. Its use was based on the conjecture that the disease involved, as an essential pathological condition, a superabundance of bile. The name "bilious" has also been applied to many affections which, in like manner, were supposed to depend more or less on an excessive secretion of bile. At the present time the term, as applied either to diseases or symptoms of disease, is not much used by medical writers. It is, however, a popular term as applied to disorders of the digestive system. An acute form of dyspepsia is popularly known as a "bilious attack," and this name is not unfrequently used by physicians. (See STOMACH, DISEASES OF.)

BILL, the proposed form of a legislative act or statute, while in the course of legislation, and before it becomes a law. In American legislation a joint resolution or resolve is also properly speaking a bill. A public bill is one which pertains to matters in which the whole community is interested. A private bill is one for the benefit or particular interest of individuals, or distinct bodies of individuals, as a single person, or a town, or a county. In ancient times the chief purpose of summoning the commons to parliament was that they should furnish supplies to the crown; but being convened, they took occasion to submit petitions on various subjects to the sovereign, and his answers to them, made with the concurrence of the lords and prelates, together with the petitions, were entered on the rolls of parliament, and at the close of the session the judges or others of the king's council put these matters into the form of an act. But it often happened that by additions to or modifications of the matter submitted, or of the crown's answer to it, the actual purpose of the parties to the proceeding was defeated. In the time of Henry V. remonstrances were made by the commons touching these evils. They demanded that the statutes should be made according to the tenor of their petitions, and in this reign or that of Henry VI. the practice was established of presenting the subject to which the approval of the sovereign was solicited in the form of a bill. Ever since that time it has been a rule of the English constitutional law not only that nothing shall be enacted without the consent of the commons, but also that, although the crown may reject or assent at pleasure to bills in parliament, it may not alter them. But if the crown is specially interested in a bill, its assent to it must be procured at some stage of its progress before its passage by the houses; and if the bill interferes with the royal patronage in any way, the royal assent to it must be had before it can proceed at all. The tenor of bills pertaining to attainders or for granting titles must be communicated to the sovereign before they are presented in parliament. The house of commons will not entertain a supply bill unless it is first communicated to it by the crown; and a bill for a pardon is regularly first signed by the king before it proceeds at all, and it is read only once in each of the houses. But in general bills are entertained by one house or the other in the first instance and independently of the crown, though they cannot become laws until they have received its assent. Practically assent is never withheld, and it is given either by the sovereign in person in the house of lords, the commons being called into that house for the occasion, or more usually it is signified by the royal commission. For the most part bills may originate in either house indifferently, but bills for supply must begin in the commons, and bills relating to the peerage, or to restitution of blood, must begin in the lords. In the commons again certain bills must originate in the committee of the whole house, such bills for example as those for granting money, or those relating to trade, or to the alteration of the laws concerning religion. But, with these and a few other exceptions, any member of the commons may ask leave to introduce a public bill. If the motion prevails, it is ordered that the bill be prepared and brought in by the mover or by a select committee to whom the matter is referred. In the lords any member may offer a bill without first obtaining leave. In either house a public bill goes regularly through five stages, namely: the first reading, the second reading, the commitment, the third reading, and finally the motion for its passage. The bill is usually first read when it is presented. It is not common to debate it at this stage, though, if it appears to be of a mischievous or extraordinary character, it may be discussed then. The first discussion of the bill usually takes place on the second reading. The commitment is a reference to a committee, either of the whole house, or if the subject of it is of a technical nature, or for any reason it is desired to have special information about it, the bill goes to a special committee, and in that case it must still go to the committee of the whole house before it passes to a third reading. In this committee the whole bill is read and considered clause by clause, and approved as it is drawn, or amended, as may be decided. The chairman of the committee then reports the bill as approved to the house itself, and it is then discussed again clause by clause, and the amendments made by the committee, or any new amendments proposed by the house, are debated. After the consideration of the bill upon the report of the committee of the whole house, it advances to the third reading. In the house of commons no substantial amendment can then be made. After the bill has been read for the third time the vote is taken on its passage, and when it is passed and the title is added, it is sent to the other house for its concurrence; and there it goes through the same course as in the commons. If the lords pass the bill, they commu-

nicate their assent to the commons, and unless it be a supply bill it remains with the upper house. If the lords reject the bill, it fails to become a law; and if they amend it, they send it with their amendments to the commons, who if they accept them signify their concurrence to the upper house, or if not they may ask a conference on the bill. When the two houses have finally agreed upon a bill, it is deposited with the lords to receive the royal assent, though if it is a supply bill it remains with or is sent to the commons. Substantially the same course of proceeding here detailed is followed in the case of a public bill which originates with the lords.—With reference to private bills the procedure is in some respects different, especially in the earlier stages. By certain standing orders bills relating to local improvements or to public works like railways, involving condemnation of lands and other property, or to municipal regulations, cannot be introduced except on petitions which have been for a certain period deposited in the private bill office, and after certain notices have been given to persons whose interests are to be affected. Officers called examiners inquire into and report upon the regularity of these preliminary proceedings before the promoters of such a bill can introduce it. The bill is after its introduction referred to a special committee, who inquire further into the merits of the proposed enactment. Petitions against the bill may be presented, and the remonstrants and petitioners are heard by the committee, who report the results to the house at different stages of the bill.—The course of proceeding upon bills in our legislative assemblies is very similar to that observed in the British parliament, upon the practice and usages of which indeed our parliamentary law is modelled. In our legislatures bills are presented without any special formality. A member who wishes to introduce one, whether reported by a committee or otherwise, makes a suggestion to that effect in the house, and the bill is received if no objection is made. In congress one day's notice of the presentment of the bill must be given. Bills which have originated in one house are presented by it to the other by message. By an old rule of congress it is declared that the first reading of a bill is for information, and if opposition be made to it the question is put whether the bill shall be rejected; if that is decided in the negative, or if there is no opposition to the reception of the bill, it goes to a second reading. The second reading usually takes place at some later day than that of the first reading, but in cases of urgency not only both these readings but all the proceedings on the bill may take place on the same day. The second reading is the most important stage. The principles and merits of the bill are then thoroughly discussed. Then follows the commitment, public bills being referred to the committee of the whole house and private bills being sent to special committees. The object of the commitment is to put the bill into the form which will effectuate its object. In this stage it receives amendments or additions, amendments being changes in the matter of the bill as it is proposed, and additions being substantive interpolations in the form of qualifying or restrictive clauses, such as provisos. The report of the committee either approves the bill as it is proposed, or returns it with such amendments or additions; and it is presented to the house by its chairman. The next proceeding is engrossment of the bill preparatory to the third reading. The engrossment of bills has been discontinued in the British parliament since 1849, but it is still practised in congress and in many of our states. The proceedings in committee of the whole house and on the third reading are substantially like those in the English parliament. In some of the states it is ordered by constitutional provisions that the bill be read three times, and in others that the readings be on three different days before it can become a law, though in some instances this requirement may be dispensed with by a vote of a certain proportion of the members of the legislature. It has been mentioned that money bills in England must originate in the house of commons. A provision of a similar character, requiring such bills to proceed from the lower or popular branch of the legislature, exists in the constitution of the United States, and in many of our state constitutions; but it does not exist in those of New York, Connecticut, Illinois, Michigan, California, and several others.—The practice in this country with reference to bills after they have passed both houses is regulated by the rules of these bodies in the several states. The practice in congress, which is followed in many of the states substantially, is governed by a rule adopted in 1794. After passing both houses the bill is engrossed on parchment, then certified by the clerk of the house in which it originated, and then delivered to the committee on enrolled bills for examination. Enrolled bills after their examination are signed by the speaker of the house and by the president of the senate, and entered on the journal of each house. The committee then presents the bill to the executive for his approval. There is ordinarily no time prescribed in which the bill is to be presented to the executive, and it may be immediately upon the passage of the bill and before the close of the session. If the executive does not approve the bill, he is required to return it with his objections to the house in which it originated within a certain number of days, and if it is not returned within that time it becomes a law as if he had signed it, though in some of the states it is provided that the omission on the part of the executive shall not render the bill a law if the house adjourns within a certain period after the bill is sent to him. The period within which the executive must sign the bill varies in the different states. In many it is

ten days, in others six, in others five, and in one or two cases three. It is usually provided however by the state constitutions that though a bill is returned unsigned and with objections by the executive, yet if on a reconsideration it be passed by the houses by certain majorities it shall become a law notwithstanding the veto. This constitutional majority differs in different states. In some it is two thirds or other proportion of the actual members of the legislative body, and in some such proportion of the members actually present.—The constitutions of most of our states contain provisions relating to the form of bills. Thus, to prevent abuses by putting in the body of a bill matters which are not suggested by its title, by which contrivance the legislature or the people may be misled and deceived as to the real purport of an enactment, it is declared in many of the states that no bill shall embrace more than one subject, and that that shall be expressed in its title. In some of the states this prohibition is restricted to private or local bills; and in some of them it is declared that when this requirement is violated the bill shall be invalid only as to so much of it as is not disclosed by the title.—When an enacting style, as it is called, is furnished by constitution or statute, it must be followed in the language of the bill or it cannot become a law. In England the present form is: "Be it enacted by the queen's most excellent majesty, by and with the advice and consent of the lords spiritual and temporal in this present parliament assembled, and by the authority of the same." The constitution of the United States provides no such enacting clause, nor was there any statute upon the subject until the year 1871. By an act of Feb. 25 of that year (ch. 71) it is provided that the enacting clause of all acts of congress henceforth shall be in the following form: "Be it enacted by the senate and house of representatives of the United States in congress assembled;" and the like clause of joint resolutions shall be: "Resolved by the senate and house of representatives in congress assembled;" and no further enacting or resolving words shall be used in any subsequent section or resolution after the first.—The constitution of the United States prohibits congress from passing any bill of attainder or *ex post facto* law, and prohibits the states from passing either of these or any law impairing the obligation of contracts. Some of the states forbid their legislatures from passing bills of attainder for treason or felony. Many of the state constitutions also forbid the enactment of retrospective laws. This provision covers as well civil as criminal cases, and is therefore of wider scope than the prohibition of *ex post facto* laws, which refers to criminal laws only. In some states the passing of judicial bills such as those which grant divorces is also prohibited.

BILL, Brownbill, Glaive, Voulge, or **Gisarme,** all names for nearly the same instrument, which, with some slight modification, was the standing weapon of the English infantry at close quarters, from the time of the battle of Hastings till that of Queen Elizabeth. The original brownbill was a ponderous cutting weapon with two edges, that forward of the shaft having a concave or sickle blade, that to the back a sort of angular cutting face, the upper part projecting before the base, so as to give a

drawing blow. This terrible instrument was nearly 3 ft. in length and 10 or 12 lbs. in weight, set erect on a shaft of 3 or 4 ft. It was wielded with both hands, and could sever a horse's head or a man's thigh or shoulder, through the strongest mail or plate armor. The weapon was afterward lengthened and lightened, and provided with a spear head, so that the holder could charge it like a lance, and sometimes with a cutting hook, for severing the bridles of the men-at-arms, or pulling them out of their saddles.

BILL OF CREDIT, paper issued by the authority and upon the faith of the state, and designed to circulate as money. By the constitution of the United States the states are prohibited from issuing bills of credit; but it has been held that the bills of banking corporations chartered by the state do not come within the inhibition, even though the state may be owner in whole or in part of the stock.

BILL IN EQUITY, the statement of the plaintiff's case in an equity suit. In English law it is addressed to the lord chancellor, and, commencing with the names of the plaintiffs, proceeds to state the circumstances of their case and the grievance to be redressed, setting out or making reference to all documentary evidence relied on. From the statement it proceeds to charge against the defendants, collectively or individually, the various facts which either specifically or by induction constitute the gravamen of the case. It concludes with the prayer for relief, and with interrogatories, both general and specific, to which the plaintiffs require an answer. The bill may not join distinct subjects of complaint; if it does, it is objectionable for multifariousness. It must contain no irrelevant matter, otherwise it may be excepted to for impertinence; nor scandalous matter, that is, the narrative of mere hearsay report, or personally offensive expressions, which may be expunged. The introductory or narrative part must support the charging part; the charges must cover all the case intended to be made against the defendants, and the interrogatories must demand specific information, either affirmation, denial, or explanation, upon all those points which are important to

the establishment of the plaintiffs' case. As new facts come to the plaintiffs' knowledge, either from the defendants' admissions or from other sources, the bill may be amended, and new interrogatories added; while bills of revivor and supplement are filed to bring the representatives of deceased parties, assignees of parties, or newly born children before the court. The bill is met on the part of the defendants either by demurrer, which admits the facts alleged, but denies that they make out a cause of equitable jurisdiction; or by plea, which presents some single ground of defence supposed to constitute a bar; or by answer, which is a specific reply to the various allegations of the bill. A demurrer or plea will present an issue of law for argument; but if the plaintiff wishes to dispute the facts set up in the plea or answer, he will do so by replication, whereby an issue will be made upon which proofs can be taken. The plaintiff in equity is called complainant, and in addressing the court in his bill he will style himself "your orator."—By codes in New York and many other American states the old forms of equity pleading are abolished, and a simple complaint reciting the facts constituting the supposed cause of action is substituted for the bill.

BILL OF EXCHANGE. See EXCHANGE.

BILL OF HEALTH. See QUARANTINE.

BILL OF INDICTMENT. See INDICTMENT.

BILL OF LADING, a commercial instrument, signed by the master of a ship as the receipt for cargo to be conveyed as freight. This document specifies the goods, the ship, the consignor and consignee, the price, and the port of delivery, with such other particulars as may be requisite. It stipulates for their safe delivery, and constitutes the contract between the shipper and the ship owner. It is generally signed in duplicate, the two parts of which are transmitted to the consignee by different channels. Certain exceptions are usually mentioned, against which the carrier does not guarantee the goods, as the acts of God, enemies in time of war, fire, and the accidents of navigation. The goods are usually deliverable to consignees or their order, sometimes to the order of the shipper, upon payment of freight, as mentioned, primage, and average. Primage is a perquisite to the master—a small percentage on the freight. Average is the share in certain small expenses of the ship—pilotage, towage, harbor dues, &c. The bill of lading is assignable, and transfers the ownership of the goods, subject to the shipper's right of stoppage *in transitu*. Accordingly, the assignee can maintain an action for recovery of the goods from the carrier. The master's contract is complete on delivery of the goods, in good order, at the usual place of delivery of the port, and upon notice given thereof to the consignee, unless there be any particular stipulation as to the mode of delivery.

BILL OF RIGHTS, in English constitutional law, properly, the act of parliament 1 William and Mary (sess. 2, c. ii.), by which certain claims contained in the declaration of rights were enacted as fundamental principles of political liberty. The declaration had been delivered at the time the crown was tendered to the prince and princess of Orange, Feb. 13, 1689. It recited the principal grievances which the nation had suffered under the preceding reign, viz.: the assumption as a royal prerogative to grant a dispensation from penal acts of parliament; the establishment of a new tribunal to determine ecclesiastical questions; levying taxes without consent of parliament; maintaining a standing army in time of peace; interfering with the administration of justice and the freedom of elections; exacting excessive bail from prisoners; inflicting barbarous and unusual punishments; and treating as criminal petitions for a redress of wrongs—all of which acts were declared to be illegal. It then asserted the right of subjects to petition; the right of parliament to freedom of debate; the right of electors to choose representatives freely; and various other privileges. These were reiterated in the act of parliament above referred to, with some additional stringency, as in respect to the dispensing power, which by the declaration had been condemned, as exercised by James, as unlawful, but by the act was absolutely and for ever taken away. These rights were again asserted, with some additions, in the act of settlement, by which the crown was limited to the Hanover family (12 and 13 William III., c. ii.). Similar provisions were appended to the constitution of the United States, as amendments thereto. They are chiefly declaratory of the freedom of speech and of the press; of the right of citizens peaceably to assemble and petition government for the redress of grievances; of the right of trial by jury; that private property shall not be taken for public use without just compensation; that no law shall be passed by congress for the establishment of any religion, or prohibiting the free exercise thereof. In the constitutions or laws of several states of the American Union is to be found a similar recital of rights, usually including the privilege of the writ of habeas corpus.

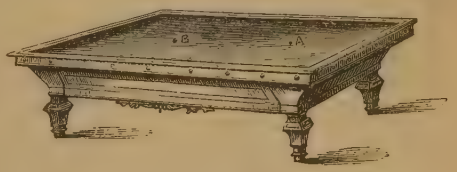
BILL OF SALE, an instrument in writing by which personal property is transferred. It is not necessary that it should be under seal, nor would a seal create any difference in the legal effect, other than that the seal imports a consideration. A bill of sale of a ship or vessel is a muniment of title of peculiar importance. In most countries it is either by custom or statute absolutely required. In this country every transfer of a registered ship must be accompanied by a bill of sale setting forth the certificate of registry.

BILLAUD-VARENNE, Jean Nicolas, a French revolutionist, born at La Rochelle, April 23, 1756, died in Hayti, June 3, 1819. He was an advocate of Paris, and at the beginning of the revolution became conspicuous for his hostility

to the government and the clergy, whom he assailed in several publications. On July 1, 1791, at one of the meetings of the "Friends of the Constitution," he proposed to change the French monarchy into a republic; the same year he published his celebrated pamphlet *Acéphalocratie*, and was appointed a member of the commune of Paris. In 1792 he took his seat in the convention, where he voted not only for the death of the king, but for that of the queen and ministers. He was chosen president of the convention, and member of the committee of public safety, and in this capacity founded the still existing *Bulletin des lois*, and was the framer of the revolutionary government. In 1794 he took part in the overthrow of Robespierre, but was himself soon after accused by his new allies (May 25, 1795), and together with Collot-d'Herbois, Barrère, and Vadier sentenced to transportation. For 20 years he lived at Cayenne, refusing to avail himself of the amnesty offered by Napoleon after the 18th Brumaire. In 1816, however, he escaped, and established himself at Port-au-Prince, where he barely made a living by the law.

BILLE, Steen Andersen, a Danish naval officer, born in Copenhagen, Dec. 5, 1797. He is the son of a distinguished admiral, served alternately under the Danish and French flags, and was on board the Bellone during the expedition of that vessel to South America in 1840. In 1845 he made in the Danish corvette Galatea, a voyage round the world, an account of which he published at Copenhagen in 3 vols. (1849–'51). During the Schleswig-Holstein war he was employed in the blockade of the Elbe and Weser, and of the Holstein coast. In 1852 he was appointed minister of marine, councillor, and rear-admiral, and retired in 1854.

BILLIARDS, a game played with ivory balls, propelled by a cue or tapering wooden wand in the hands of the player, upon an oblong level table. The billiard tables in common use in America are of three sizes: 6 ft. in width by 12 in length, 5 by 10, and 4 by 8. They consist of a heavy frame of wood (generally rosewood or walnut), which supports a bed of marble or slate. This bed is covered with a heavy and very fine green cloth, stretched tightly, so that the surface of the table presents not even the most trifling inequality. This surface should be about 32 inches above the floor; and its horizontal position must be established with mathematical exactness. Around the bed the frame of the table rises in a rim about an inch and a half high; the inside of this, toward the bed, is lined with elastic cushions composed of vulcanized rubber combined with other substances, horizontal on the top, and slanting upward and inward from the bottom in such a way as to present a thin edge to be struck by the ball when propelled against it. These cushions must be made with the greatest care, as a very great part of the skill attainable in the game consists in the proper calculation of the angles of incidence and reflection of the balls, in striking and leaving the elastic sides. The cushions, as formerly constructed, were of heavy, hard cloth, or of simple india rubber in what is called the "raw" state. Both kinds were found exceedingly defective; the cloth was deficient in elasticity, making the angle of reflection more obtuse than it should have been; while atmospheric changes so affected the rubber as to make it on a cold day as hard and dead as wood, and on a warm day so soft that the ball sank into it, rebounding at a more acute angle than was expected. The combination cushions now in use were patented in 1857 by Michael Phelan, a celebrated American player. They are manufactured by combining with the raw rubber strips of other materials, and then vulcanizing the whole. Billiard tables are divided into three classes: they may have four "pockets," six, or none at all. A four-pocket table has at each corner an opening between the cushions, allowing a ball to pass through and fall into a bag or pocket of network hanging below. A six-pocket table, besides pockets at the corners, has one pocket in the middle of each side. In a table with no pockets, called a carom table, the cushions continue uninterruptedly around the whole perimeter. Upon

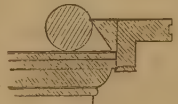


Carom Table.

the cloth of every table there are two black spots, situated as represented in the engravings given herewith, and used to mark the positions of the balls under certain circumstances to be hereafter explained. The balls should be of the finest ivory (the East Indian is the best), turned with the greatest care, and of uniform size. The cue is a staff or wand of hard wood, generally ash, varying in length from 5 ft. to 5 ft. 5 or 6 inches, and in weight from 7 to 24 oz.; it tapers from the butt, which is about an inch thick, to the point, which is about half an inch in diameter. The tip is formed of two layers of leather: a hard piece of sole leather is glued to the wood; and glued to this is a

Cue and Mace.

piece of fine French leather, slightly convex, and somewhat rough on its exposed surface to prevent its slipping from the balls; chalk is applied to it at short intervals while playing, for the same purpose. The mace, a staff of

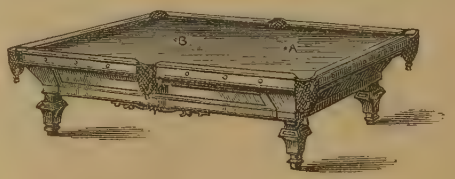


Cushion and Ball.

light wood with a boxwood head, square-fronted, and bevelled so as to slide along the cloth, is still used to some extent by ladies and children in playing billiards, and it was the first instrument employed in the game. A rough form of cue was first used about the beginning of this century, and the improved leather-tipped cue invented by M. Mingaud, a Parisian billiard player, some years later. Only after the introduction of this instrument did any really great skill in playing become possible.—In playing, the cue should be loosely held near the butt by the right hand, the portion near the tip resting on a "bridge" formed, as represented in the cut, by the left hand,

Position of the Left Hand.

which should in turn rest firmly and steadily upon the table, about six inches from the ball which is to be struck with the cue. The stroke of the cue should be given by the force of the wrist and forearm only, and should be quick and firm, not heavy even in the strongest shots. Skill and quickness are required rather than muscular strength. To strike with his own ball, in a single play, and either directly or by rebounding from the cushions, more than one of the other balls on the table—that is, in technical phrase, "to make a carom"—may be said, in brief, to be the main object of each player in the game of billiards; for those forms of the game in which a principal aim is to drive the balls into the pockets are rapidly passing out of use. In the game of billiards most common in America, four balls are used —one red, one pink, one entirely white, and the fourth white with a black point, from which it is commonly called the spot ball, or simply "the spot." At the beginning of the game the red balls are placed upon the spots marked A and B in the engravings. One player takes the white, the other the spot ball, and the question of the first play or "lead" is decided as follows: The players, placing their balls as they choose at the end of the table known as the head—it being only necessary that both shall be inside an imaginary line (the string) drawn across the table at the point A —proceed to play against the cushion at the other end; he who succeeds in making his ball, on rebounding from it, approach the nearer to the head cushion from the vicinity of which he played, leads in the game. The loser in "stringing for the lead," as this is called, now places his ball near the foot of the table, and inside an imaginary line drawn through the point B; and the play begins by the leader's playing from within the string on the ball of his antagonist. After the first shot no regard is paid to the string, to its corresponding limit at the foot of the table, or to the spots, unless one of the balls is accidentally played off the table, when if it be a player's ball its owner must play next time from within the string, and if it be a red ball it must be placed on its appropriate spot. A carom on a red and white ball counts two, in the regular rules of the game; one on the two reds counts three, and on all the balls six. But these methods of counting are very frequently varied; it being common to count every carom three, or as often to count each carom one. The game is won by the player who first makes a certain number of points; 100, 50, 34, and 21 are common numbers, according to the different games played. Where a pocket table is used and a pocket game played, to pocket a red ball counts three; an adversary's ball (though this is seldom done by good players), two; to pocket one's own ball loses three if off a red, two if off an adversary's, three if direct. In beginning play again with or upon pocketed balls the same rules apply for replacing them that have just been given for replacing balls played off the table.—In England, two white balls and one red are generally used on a six-pocket table, and the pocketing of a ball is called a "hazard;" a "red winning hazard" (counting three) if the red be pocketed; a "white winning hazard" (counting two) if the white. Should the player pocket his own ball off the red, it is a "red losing hazard" (losing three); if off the white, a "white losing hazard" (losing two). Each carom, called in England "cannon," counts two. The common limits for the game are 21 and 50.—The game played in France is that best calculated to call out skill in the player. Three balls are used, two white and one red, on a carom table. Each carom counts one. This method, though universally called the French, is becoming very common among the better players in America, and is undoubtedly the highest form of billiards.—In speaking of the game thus far, we have assumed that only two players are engaged; but billiards can also be played by four, in two sets of partners; and a "three-handed game," though somewhat irregular, is also frequently made up, each player using that white ball which his predecessor had not used —playing with "the still ball," as is technically said.—It is of course impossible in this article to describe or give directions for any of those peculiar methods of play which only practice can teach, and by which the balls can be made to perform such apparently impossible



Six-pocket Table.

feats. For these and their technical names reference must be made to special works on billiards. The best of these published in America is "The Game of Billiards," by Michael Phelan. In this manual will also be found descriptions of other games played on the billiard table, such as pyramid pool, pin pool, &c.—The origin of billiards is unknown, but it appears to have been introduced into Europe from the East at the time of the crusades, when it became a popular game among the templars, and one of the favorite amusements of monks in their monasteries. Little is known of its history until the time of Louis XI. of France, who introduced it into his court. Henry III. of France was also a prominent patron of billiards, and after his time it became common among the higher classes on the continent, and was gradually introduced into England.

BILLINGS, Joseph, an English navigator in the service of Russia, lived at the end of the 18th century. He accompanied Cook in his last voyage, and was intrusted with the astronomical department. In 1785 Catharine II. took him into her service, and sent him on an expedition to the Arctic ocean and the seas situated between Siberia and the continent of America. He set out overland in October, 1785, reached the Kolyma river in N. Siberia, and put to sea with two vessels in 1787. The expedition sailed toward the Arctic ocean, went five leagues beyond Cape Baranov, and returned to the Kolyma, whose course he explored for a considerable distance. At Okhotsk, on the Pacific coast, he built two ships for the American expedition, started anew in September, 1789, lost one of his ships, and cast anchor at the port of Petropavlovsk, where he wintered. In March, 1790, he set out to visit the islands on the south of Alaska, landed at Unalashka, traversed the island of Unimak, and cast anchor at Kadiak. In July he penetrated into Prince William sound, and cast anchor where Cook had been in 1778. He examined Cook strait thoroughly. His provisions now began to run short, and not having means to winter in these savage regions, he returned to Kamtchatka in 1791. An account of his voyage, written by Martin Sauer, was published in English at London in 1802.

BILLINGS, William, an American composer, born in Boston, Oct. 7, 1746, died there, Sept. 26, 1800. He forsook the trade of tanner to become a teacher of singing and a composer of psalm tunes, which eventually found their way into every church choir of New England. He published six collections of tunes, which, with a few exceptions, were of his own composition. Though his musical education was very slight, he had a taste in melody, and his tunes became very popular. Many of them were sung and played wherever New England troops were stationed. Billings was an intimate friend of Samuel Adams, who frequently sat with him at church in the singing choir. He is the first American composer of whom there is record.

BILLINGTON, Elizabeth, an English singer, born in London in 1769, died near Venice in August, 1818. She was the daughter of a German musician named Weichsel, and at the age of 11 played her own compositions in London. She married her music master, Mr. Billington, whom she accompanied to Dublin, where she made her first appearance on the stage. She remained there till 1786, when she returned to London; but meeting with no success she went to Paris, and took lessons from Sacchini, by whose advice she visited Italy in 1794, to perfect herself in her art. She lost her husband in Italy, under suspicious circumstances, and married at Lyons a M. Florissant. On her return to England in 1801, she was greatly admired both for the richness and culture of her voice and her personal graces. She sang at Covent Garden and Drury Lane theatres alternately. In 1809 she retired from the stage. Her husband left England in consequence of the alien act, and she followed him in 1817.

BILLITON, an island of the Malay archipelago, separated by the Carimata or Billiton passage from Borneo, and by Gaspar strait from Banca. Its highest peak, near its N. W. point, which is 2,300 ft. high, is in lat. 3° 13′ S., lon. 108° 7′ E.; area, about 2,500 sq. m.; pop. in 1869 estimated at 22,000. It is noted, like the neighboring island of Banca, which it resembles in geological formation, for its production of grain tin from alluvial deposits. Iron possessing strong magnetic properties is found in abundance; and the peculiar white iron, called *pamor*, used in damasking the Bornean Dyak sword blades, is found here in small quantities, Billiton and Celebes being the only countries where it is found. Iron has been worked since an early period by the native Sikas; but the mining of tin did not commence till 1850. The mines are worked by Chinese colonies. The soil is generally sterile, and a large portion of the rice for the consumption of the miners is brought from Java and Bali. Odoriferous woods are exported to some extent. The aborigines, a rude race called Sikas, subsist chiefly by fishing, and are accused of being prone to piracy. The island is a dependency of Holland.

BILSON, Thomas, an English divine and author, born in Winchester in 1536, died in Westminster, June 18, 1616. In 1596 he was consecrated bishop of Worcester, and the following year became bishop of Winchester, and was sworn of the privy council. He published "The true Difference between Christian Subjection and Unchristian Rebellion" (4to, Oxford, 1585), a vindication of the supremacy of Queen Elizabeth and her policy in the Low Countries; "The Perpetual Government of Christ's Church" (4to, London, 1593; new ed., Oxford, 1842), an argument for episcopacy; and other works.

BILSTON, a market town of Staffordshire, England, 3 m. S. E. of Wolverhampton; pop.

about 25,000. It is the centre of extensive coal mines, and of a large iron trade, the founderies being engaged in every kind of iron work, as well as in the manufacture of steel and japanned wares. In the vicinity is a remarkable quarry, the stone of which is manufactured into grindstones, whetstones, and millstones. At Bradley, an adjoining village, is a coal mine which has been on fire for about 80 years. A market hall has recently been erected. The "orphan cholera school" was endowed in 1833, for the education of the children of victims of the cholera, which had carried off great numbers of the inhabitants in the previous year. Numerous canals facilitate transportation. It was at Bilston that James Watt first applied the steam blast to furnaces. The town is included in the parliamentary borough of Wolverhampton.

BIMA, the principal state of the island of Sumbawa, and seat of a Dutch residency, occupying the E. part of the island. The Dutch fort at the head of the bay of Bima is in lat. 8° 35′ S., lon. 118° 40′ E. Before the eruption of the mountain Tomboro (1815), situated at the extremity of the northern peninsula of the island, which was the most terrific volcanic eruption on record, the inhabitants numbered 90,000, but at present there are only about 45,000. It is governed by a sultan, who acknowledges the sovereignty of Holland. The soil is unproductive. The surface consists of trachytic ridges, separated by ravines often very deep, in which run streams impetuous in the rainy season, and very small in the dry. The chief productions which have attracted Europeans are sandal and sapan wood; salt and rice are also produced. Saltpetre and sulphur are found, and beeswax and horses are exported to Java. The horses of Bima are much esteemed in the Indian islands. The inhabitants speak a language which has been regarded by some philologists as distinct from the Malay or any other language of the archipelago. The Dutch fort has a small garrison, chiefly of Javanese and Bughis troops. There are also several thousand Bughis settlers in the territory. The inhabitants are principally Mohammedans. The chief town and port also is called Bima.

BIMINI, an imaginary island of the Bahamas, said to contain the fountain of youth, in search of which Ponce de Leon set out from Porto Rico in March, 1512, on the expedition which resulted in the discovery of Florida.

BINARY ARITHMETIC. See Arithmetic.

BINDRABUND, a town of Hindostan, in the British district of Muttra, Northwestern Provinces, on the W. bank of the Jumna, about 35 m. N. W. of Agra; pop. 20,000. It is a place of resort for Hindoo pilgrims, who hold it in veneration as the residence of the god Krishna during his youth. It contains a number of temples, and the river for about a mile is lined with red stone steps, where the devotees perform their ablutions.

BINGEN (anc. *Vincum* or *Bingium*), a town of Hesse-Darmstadt, opposite Rüdesheim, on the left bank of the Rhine, at the mouth of the

Bingen.

Nahe, 17 m. W. of Mentz; pop. in 1871, 5,936. A famous wine called Scharlachberger is produced upon the neighboring Scarlet or Scharlach mountain. Near Bingen is the Bingerloch, or Bingen hole, a compression of the Rhine into a narrow strait between towering rocks. High above them rises the Mäusethurm, or mice tower, so called from the legend that Arch-

bishop Hatto of Mentz, who used it as a granary for speculative purposes during times of famine, was gnawed to death there by mice in 969. According to another tradition, the original name of the tower was Mauththurm, or toll tower. This tower was in a very dilapidated condition till 1856, when it was restored. The picturesque aspect of Bingen is enhanced by the adjoining Rupertsberg, with the ruins of a convent, and the Rochusberg, upon the summit of which stands a chapel, annually visited by pilgrims, as well as the ruins of an ancient castle, where in 1105 the German emperor Henry IV. was imprisoned by his son. In the time of the Romans the town formed part of Belgic Gaul. The castle built by the Romans upon the Rochusberg bore in the middle ages the name of Klopp castle. The name of its principal tower is Drususthurm. Hence the name of Drususbrücke applied to the beautiful bridge over the river Nahe. The *Nibelungenhort*, or the treasure of King Nibelung, which gave the name to the celebrated *Nibelungenlied*, was, according to tradition, sunk in the Rhine not far from Bingen.

BINGHAM, Joseph, an English scholar and divine, born at Wakefield, Yorkshire, in September, 1668, died Aug. 17, 1723. An unfortunate controversy, in which he took a prominent part, forced him to resign his fellowship at Oxford; he was, however, presented to the rectory of Headbourn-Worthy, in Hampshire. There he began his famous "Origines Ecclesiasticæ, or Antiquities of the Christian Church" (10 vols., 1708–'22). In 1712 he was presented to the rectory of Havant, near Portsmouth. In 1720 he was one of the many that were ruined by the South sea bubble.

BINGHAMTON, a city and the capital of Broome county, N. Y., situated at the junction of the Chenango and Susquehanna rivers, about 8 m. from the Pennsylvania boundary, and 118 m. W. S. W. of Albany; pop. in 1870, 12,962. It is on the Erie railway, at the terminus of the Albany and Susquehanna, Syracuse and Binghamton, and Delaware, Lackawanna, and Western railroads, and also on the Chenango canal. It is handsomely laid out; is well supplied with water power by the Chenango river; has numerous manufactures and an extensive flour and lumber trade; and contains 15 schools, 11 churches, 2 newspaper offices, and several banks. The state inebriate asylum is located here. Binghamton was settled in 1787 by William Bingham of Philadelphia, and incorporated as a city in 1867.

BINGTANG, or **Bintang,** an island of the Rhio-Linga group, in the Malay archipelago. Mt. Bingtang, its highest peak, 1,368 ft. high, is in lat. 1° 4′ N., lon 104° 28′ E. Rhio, the Dutch free port, is in lat. 1° 54′ N., lon. 104° 26′ E. Area of the island, about 450 sq. m; pop., with Rhio, situated on Tanjong Pinang, an adjoining islet, about 20,000. Iron and tin are found, but not extensively mined. The gambier plant (*uncaria gambier*), which produces terra japonica, is the chief product of the island. A large number of gambier plantations, yielding about 4,000 tons a year, are cultivated by Chinese colonists, who raise black pepper at the same time. Other productions are cocoanuts, durian fruit, much prized by the natives, caoutchouc, gutta percha, and damar. The native Malays are outnumbered by the Chinese. The island is subject to the sultan of Johore, on the peninsula.

BINNACLE (formerly spelled bittacle; Fr. *habitacle*, a little habitation), a case or box in which the compass and lights are kept on board ship. It is sometimes divided into three compartments, the two sides containing a compass, and the middle division a lamp. In order that the needle may not be affected, the binnacle is put together without nails or any iron work. On board iron steamers, it is an object of the first importance to isolate the binnacle as completely as possible.

BINNEY, Amos, an American savant and patron of art and science, born in Boston, Mass., Oct. 18, 1803, died in Rome, Feb. 18, 1847. He was educated at Brown university and studied medicine, but engaged in mercantile pursuits, and devoted a great deal of time to science, especially mineralogy and conchology. He was one of the founders of the Boston society of natural history, and its president from 1843 to 1847, a member of all the scientific societies in the country, and active in the formation and promotion of the American association of geologists and naturalists, of which he was the president elect at the time of his death. When a member of the state legislature he used his influence to sustain the geological survey of the state, and succeeded in having attached to it a commission for the zoological and botanical survey also, which resulted in the important volumes of Harris on insects injurious to vegetation, Emerson on forest trees, Storer on fishes, Gould on invertebrata, &c. He wrote many valuable papers in the proceedings and the journal of the Boston society of natural history, devoted many years to the study of the terrestrial mollusks of the United States, and fitted out several expeditions to Florida, Texas, and other unexplored regions, to collect materials. He employed the best artists to delineate and engrave figures for his work on this subject, "Terrestrial and Air-breathing Mollusks of the United States and adjacent Territories of North America," which was published after his death, under direction of his friend Dr. A. A. Gould (2 vols. of text and 1 vol. of plates, Boston, 1851).

BINNEY, Horace, an American lawyer, born in Philadelphia, Jan. 4, 1780. He was long one of the leaders of the Philadelphia bar, and has published "Reports of Cases in the Supreme Court of Pennsylvania from 1799 to 1814" (6 vols., Philadelphia, 1809–'15), and a number of legal pamphlets, addresses, &c. He was for many years director in the first bank of the United States, and acted as trustee in

winding up the affairs of that institution. He took no prominent part in national politics until the election of Gen. Jackson; but he then came forward in opposition to that administration, and was elected to congress. In that body he immediately obtained a commanding position. Since his retirement from political life his most celebrated effort was the defence of the city of Philadelphia in the supreme court against the suit brought by the heirs of Stephen Girard. The arguments of Mr. Binney and others in this case have several times been printed in book form by the city of Philadelphia. His sketch entitled "The Leaders of the Old Bar of Philadelphia" (1859) gives a vivid portraiture of some of the remarkable jurists of the time. In 1862 he published two pamphlets on "The Privilege of the Writ of Habeas Corpus under the Constitution," in defence of the power of the president to suspend the writ without a previous authority from congress. In a third essay written in 1865 he showed that the suspension of the writ does not involve the right to proclaim martial law or arrest a citizen without a warrant and cause assigned.

BINNEY, Thomas, an English dissenting clergyman, born at Newcastle-on-Tyne in 1798. He studied at Wymondley college, was for some time minister of an Independent chapel at Newport, Isle of Wight, and from 1829 to 1871 of the King's Weigh-house chapel, then in Eastcheap, afterward in the new building on Fish street hill, London. The degree of LL. D. was conferred on him by the university of Aberdeen, and that of D. D. he received in the United States, which he visited in 1845 as well as Canada; and in 1857–'9 he visited Australia. He introduced chanting into the service of Independent congregations, improved the psalmody by his "Service of Song in the House of the Lord," and acquired renown as one of the most popular preachers of England. He has published many works of a religious character, several being expressly designed for the young. Among them are: "Fiat Justitia," a series of pamphlets treating upon topics which have agitated the religious public; "Dissent not Schism," "The Christian Ministry not a Priesthood," and others of a polemical nature. "The Practical Power of Faith" (1830) is a series of sermons on the 11th chapter of Hebrews. The "Life of Sir Thomas Fowell Buxton," and "Is it Possible to Make the Best of Both Worlds?" were originally delivered as lectures. During his visit to Australia he wrote a review of the bishop of Adelaide's "Idea of the Church of the Future," which he afterward expanded into the "Lights and Shadows of Church Life in Australia." In 1868 he published "From Seventeen to Thirty," a work for the young; and in 1869 a volume of sermons. Other works are, "St. Paul, his Life and Ministry," "Micah the Priest-maker," and "Thoughts on some Things at Home."

BIOBIO, a river of Chili, which rises in Lake Huehueltui, about lat. 38° S., lon. 71° W., and flows N. W. through the provinces of Arauco and Concepcion, partly separating them. It receives several mountain streams and small rivers, and after a course of 180 m. falls into the Pacific at the city of Concepcion, through a channel $1\frac{3}{4}$ m. wide, with a bar which impedes the entrance of large vessels. It is navigated most of the year by small craft and barges to Nacimiento, 80 m. from its mouth, and in most parts is very picturesque. The Biobio, called by the aborigines Biu-biu (double string), or Butanleuvu (great river), was the scene of Valdivia's first onslaught against the Araucanians, and of numerous battles during the wars of conquest and of independence.

BIOLOGY (Gr. *βιος*, life, and *λόγος*, doctrine), the study of the conditions and phenomena of life and living beings. This term was introduced by Lamarck and Treviranus in 1802, and has been used by Carus, Oken, Schelling, and other German philosophers, to denote the ultimate conditions of human life. It was partially revived by Comte (*Philosophie positive*) in 1838, and has since been employed by some writers in preference to physiology, as being a term of greater scientific comprehensiveness and exactitude. We have accordingly the "Biological Journal" and the "Society of Biology," and Herbert Spencer has made biology the title of one of the departments in his system of "Synthetic Philosophy."

BION, a Greek pastoral poet, born near Smyrna, flourished about 280 B. C. On attaining manhood he emigrated to Sicily, where he fell a victim to a conspiracy and died of poison. His poems are all in hexameter verse, some of them erotic. A few remain entire, and fragments of others are extant; they are generally printed with the bucolic poems of his disciple Moschus and of Theocritus.

BIOT, Jean Baptiste, a French savant, born in Paris, April 21, 1774, died Feb. 2, 1862. He served for some time in the artillery, entered the polytechnic school in 1794, became a professor in the central school of Beauvais, and in 1800 professor of physics in the collége de France. In 1803 he was elected a member of the academy of sciences, and the following year entered the observatory of Paris. In conjunction with Arago he continued the researches into the refracting power of gases, already begun by Borda. In 1806 he was associated with Arago, in Spain, in measuring an arc of the meridian. He was next appointed professor of physical astronomy in the faculty of sciences, and in 1817 he made a journey to the Orcades for the purpose of correcting the observations relating to the measure of the meridian. In 1856 he became a member of the French academy. His fame rests chiefly upon his astronomical, mathematical, and physical writings. His *Traité de physique expérimentale et mathématique* (4 vols., Paris, 1816) is regarded as his masterwork. A third edition of his *Traité élémentaire d'astronomie physique* was completed in 5 vols. in 1857. In 1858 he

collected three volumes of his *Mélanges scientifiques et littéraires.*

BIPONT EDITIONS, famous editions of the Latin classics, published in the city of Deux-Ponts or Zweibrücken (Lat. *Bipontium*), in the Rhenish Palatinate. The publication was begun in 1779, but after the French conquest was finished in Strasburg. The collection forms 50 vols. 8vo.

BIRCH (*betula*), a genus of monœcious trees or shrubs, which have as generic features both sterile and fertile flowers in scaly catkins, three of each under each bract, with no involucre to the broadly winged nutlet which results from a naked ovary. The sterile catkins are long and drooping, formed in summer, remaining naked through the succeeding winter, and expanding their golden flowers in early spring, preceding the leaves. The fertile catkins are oblong or cylindrical, protected by scales through the winter, and developed with the leaves. The

Leaves and Catkin of White Birch.

outer bark is usually separable in thin horizontal sheets; the twigs and leaves are often spicy and aromatic, and the foliage is mostly thin and light. The birch and the alder (*alnus*) were classified in the same genus by Linnæus in his later works, but are now generally regarded as distinct by botanists.—There are 19 recognized species of birch, for the most part lofty-growing and ornamental trees, found native in Asia, Europe, and America, and almost all preferring the cold regions of the northern latitudes. The most widely extended of them is *B. alba*, or common white birch, a native of Europe, and found in America, near the coast, from Pennsylvania to Maine, which thrives in every kind of difficult and sterile soil, but decays where the ground is rich. It is found, though dwarfed in size, higher on the Alps than any other tree, approaches near to the icy regions of the north, and is almost the only tree which Greenland produces. It has a chalk-white bark, and triangular, very taper-pointed, shining leaves, tremulous as those of an aspen. It serves many purposes of domestic economy. The bark is employed by the Greenlanders, Laplanders, and inhabitants of Kamtchatka in covering their

Trunk of White Birch.

huts and in making baskets and ropes. An infusion of the leaves makes a yellow dye, and is also drunk like tea by the Finns; and the Russians and Swedes prepare from the sap of the trunk a fermented liquor resembling champagne. —The most graceful tree of the genus is the *B. pendula*, growing both in mountainous situations and bogs, from Lapland to the subalpine parts of Italy and Asia. Its popular name is the weeping birch, and it is distinguished for its

Weeping Birch.

suppleness and the graceful bend and falling inclination of its long boughs. Its picturesque appearance, with its white and brilliant bark and gleaming, odoriferous leaves, makes it a

favorite in parks and gardens.—The *B. lenta*, cherry or black birch, called also the mountain mahogany from the hardness of its wood, has a dark, chestnut-brown bark, and abounds particularly from New England to Ohio, and on the summits of the Alleghany mountains. Its leaves, bark, and wood are aromatic; the wood is rose-colored, fine-grained, and valuable for cabinet work.—The *B. papyracea*, or paper birch, is that from which the aborigines of America make the canoes with which they navigate lakes and rivers, and hence it is also called the canoe birch. It is a native of Canada and the northern United States, and is superior to all other species for its tough bark, in paper-like layers, which is so durable that the wood of the fallen tree will rot entirely away while the case of bark remains sound and solid.—The *B. nigra*, the river or red birch, is an alder-like American species, with whitish leaves and reddish-brown bark, found from Massachusetts to the southern states. Barrel hoops are made from its branches, and its tough twigs are the best materials for coarse brooms. The negroes also make vessels from it to contain their food and drink.—The *B. nana*, dwarf or Alpine birch, is a native of the Alps and of the mountains of Lapland. The Laplanders burn it on summer nights to drive off a kind of mosquito, and sleep in the fragrant smoke. It has been introduced into this country, and appears as a small shrub on the summit of mountains in Maine and New Hampshire, and in other frigid situations northward.

BIRCH, Samuel, an English Egyptologist, born in London, Nov. 3, 1813. He is the son of a clergyman, entered the office of the commissioners of public records in 1834, and in 1836 became connected with the archæological department of the British museum, where from 1861 to 1870 he had charge of the oriental, mediæval, and British antiquities and ethnography, but since 1870 only of the Egyptian and oriental antiquities. His publications include descriptions of antiquities of the British museum ("Gallery of Antiquities," 1842); the text for Owen Jones's "Views on the Nile" (1843); "Catalogue of Greek and Etruscan Vases in the British Museum," in conjunction with Mr. Newton (1851); "Introduction to the Study of the Egyptian Hieroglyphs," contributed to Wilkinson's "Egyptians in the Time of the Pharaohs" (1857); "History of Ancient Pottery" (2 vols., 1858); and "Description of the Papyrus of Nas-Khem," privately printed in 1863 at the request of the prince of Wales, under whose direction this discovery had been made at Thebes. He also prepared brief stories and romances from the Chinese, including in 1863 "The Elfin Foxes." At the request of his friend Bunsen he edited after his death and wrote the greater part of the 5th and last volume of his work on Egypt, bringing the Egyptological discoveries down to 1867 in this as well as in his second edition of the first volume.

BIRCH, Thomas, D. D., an English historical and biographical writer, born in London, Nov. 23, 1705, died by falling from his horse, Jan. 9, 1766. He was of Quaker parentage, entered the priesthood of the church of England without a university education, and became secretary of the royal society. "Thurlow's State Papers," "Lives of Archbishop Tillotson and Hon. Robert Boyle," editions of Milton's prose works and of the works of Raleigh, "A General Dictionary, Historical and Critical," and "A Series of Biographical Memoirs," are among his publications.

BIRCH-PFEIFFER, Charlotte, a German actress and dramatist, born in Stuttgart in 1800; died in Berlin, Aug. 25, 1868. Her maiden name was Pfeiffer, and she married in 1825 Dr. Birch of Copenhagen. For about 20 years she performed in the various theatres of Germany, made excursions to St. Petersburg, Pesth, Amsterdam, and other cities, and in 1837 undertook the management of the Zürich theatre, which she retained till 1843, when she received an appointment at the royal theatre of Berlin. She wrote several novels and some 70 plays.

BIRD, Edward, an English painter, born in Wolverhampton, April 12, 1772, died in Bristol, Nov. 2, 1819. He was the son of a carpenter, and after serving an apprenticeship to a painter and japanner, opened a drawing school at Bristol. He succeeded best with domestic and general subjects.

BIRD, Golding, an English physician and author, born in Norfolk in 1815, died at Tunbridge Wells in October, 1854. He early received a prize from the apothecaries' company for his proficiency in botany, and in his 22d year he became lecturer on natural philosophy, and subsequently also on materia medica, at Guy's hospital, London. He had besides an extensive medical practice. His "Elements of Natural Philosophy, being an Experimental Introduction to the Physical Sciences" (in concert with C. Worth, London, 2d ed., 1844), is a standard work of great popularity in England and in the United States. His other publications are: "Lectures on Electricity and Galvanism in their Physiological and Therapeutical Relations" (revised and enlarged ed., 1847), and "Urinary Deposits" (5th ed., by E. L. Birkett, 1857). See "Biographical Sketches of the late Dr. Golding Bird," by John Hutton Balfour (London, 1855).

BIRD, Robert Montgomery, an American physician and author, born at Newcastle, Del., in 1803, died in Philadelphia, Jan. 22, 1854. He was educated in Philadelphia, where he began the practice of his profession, and made his first literary ventures in the columns of the "Monthly Magazine." His tragedy of "The Gladiator" long retained its popularity upon the stage, chiefly through the personation of Mr. Edwin Forrest. His novels, published at intervals between 1830 and 1840, are chiefly historical romances. The scene of "Calavar" and "The Infidel" is in Mexico, at the time of the Spanish

conquest; that of "Nick of the Woods, or the Jibbenainosay," in Kentucky, at the close of the war of the revolution; "Peter Pilgrim" contains a minute description of the Mammoth cave in Kentucky; and "The Adventures of Robin Day" is the story of a shipwrecked orphan. Dr. Bird was for some time editor of the "North American Gazette."

BIRDE, or **Byrd, William,** an English composer, born about 1540, died July 21, 1623. He was a pupil of Tallis, and in 1563 was chosen organist of Lincoln cathedral. In 1569 he was appointed gentleman of the chapel royal, and six years afterward organist to Queen Elizabeth. The number of his vocal compositions, chiefly sacred, was enormous; and his pieces for the organ and virginals were almost as numerous. Among the latter is a collection of nearly 70 MS. compositions, known as Queen Elizabeth's virginal book. The fine canon, *Non nobis, Domine*, frequently sung in England, is a good specimen of his sacred vocal music.

BIRD ISLANDS, a cluster of the Leeward islands of the Lesser Antilles, immediately N. of the gulf of Triste, Venezuela. They are so named from the immense numbers of birds that frequent them. They belong to the Dutch, and are inhabited by only a few fishers.

BIRD LIME, a glutinous, viscid substance, of greenish color and bitterish taste, prepared by boiling the middle bark of the European holly (*ilex aquifolium*), or the young shoots of elder and other plants, as the mistletoe and other parasites, separating the gummy matter from the liquid, and leaving it for a fortnight in a moist cool place to become viscid. It is next pounded into a tough paste, well washed, and put aside for some days to ferment. Some oil or thin grease is incorporated with it, when it is ready for use. Its characteristic properties appear to identify it with the principle *glu* of the French chemists, which exudes spontaneously from certain plants. It differs from resins in being insoluble in the fixed oils. Bird lime is so tenacious that small birds alighting upon sticks daubed over with it are unable to escape. It is used for this purpose and also for destroying insects. Large quantities of it were formerly exported from Great Britain to India, but it is now imported into England from Turkey.

BIRD OF PARADISE (genus *paradisea*, Linn.), a name given to a group of moderate-sized, cone-billed birds of the Malay archipelago, noted for the extraordinary development of the plumage, its extreme delicacy, and brilliant colors. The genus is characterized by a long, strong bill, with the culmen curved to the emarginated tip, and the sides compressed; the nostrils lateral and covered by short feathers which conceal the base of the mandible; the wings long and rounded, with the 4th and 5th quills equal and longest; the tail is of various lengths, even or rounded; the tarsi as long as the middle toe, robust and covered by a single lengthened scale; the toes very long and strong, the outer larger than the inner, and united at the base, the hind toe long and robust; the claws long, strong, much curved and acute; the sides of the body, neck, breast, tail, and sometimes the head, ornamented with prolonged showy feathers. These birds are active and lively in their movements, and are usually seen on the tops of high trees, though they descend in the morning and evening to the lower branches to search for food, and to hide in the thick foliage from the heat of the sun. The food consists chiefly of the seeds of the teak tree, and of a species of fig; they also devour grasshoppers and other insects, stripping off the wings and legs before swallowing them; in confinement they will eat boiled rice, plantains, and similar food. Their cry is loud and sonorous, the notes being in rapid succession; the first four notes

Greater Paradise Bird (Paradisea apoda).

are said by Mr. Lay to be clear, exactly intonated, and very sweet, while the last three are repeated in a kind of caw, resembling those of a crow or daw, though more refined.—The best known species is the greater paradise

bird (*P. apoda*, Linn.), whose body is about as large as a thrush, though the thick plumage makes it appear as large as a pigeon; it is about 12 inches long, the bill being 1½ inch. The head, throat, and neck are covered with very short dense feathers, of a pale golden color on the head and hind part of the neck, the base of the bill being surrounded with black velvety ones, with a greenish gloss; the fore part of the neck is green gold, with the hind part, back, wings, and tail chestnut; the breast chestnut, inclining to purple. Beneath the wings spring a large number of feathers, with very loose webs, some 18 inches long, resembling the downy tufts of feather grass; these are of different colors, some chestnut and purplish, others yellowish, and a few nearly white. From the rump spring two middle tail feathers, without webs except for the first few inches and at the tip, and nearly three feet

Red Bird of Paradise (Paradisea rubra).

in length; the remaining tail feathers are about 6 inches long, and even at the end. The natives call this bird *manuk-dewata*, or "bird of the gods," from which perhaps the common name is derived. The Malay traders, who first brought them from Papua, cut off the legs of these birds, and pretended that they lived in the air, buoyed up by their light plumage, never descending to the ground, and resting at night suspended from the trees by the long tail feathers; hence their specific name. Other fables, such as that they fed on the morning dew, hatched their eggs out between the shoulders, and came from the "terrestrial paradise," were added in order to increase the value of these beautiful birds in the Indian markets. From the nature of their plumage they cannot fly except against the wind; when the feathers get disordered by a contrary breeze they fall to the ground, from which they cannot readily rise; in this way many are caught; others are taken by bird lime, or shot by blunt arrows, or so stupefied by *cocculus Indicus* as to be caught by the hand. When at rest they seem to be very proud of their beauty, carefully picking from their feathers every particle

King Bird of Paradise (Cicinnurus regius).

of dust. They are shy and difficult of approach. Batavia and Singapore are the chief ports whence these birds are exported to Europe; the Bughis of Celebes bring great numbers of them thither in their boats from Papua and the Arroo group. The whole bird is a highly coveted ornament for the heads of the East Indian grandees, as well as for the bonnets of the civilized fair sex.—The *P. Papuana* (Bechst.) is a smaller bird, of the same general appearance, with the throat and neck before green; top of

Superb Bird of Paradise (Lophorina atra).

the head, nape, and neck ferruginous yellow; back yellow with a grayish tinge; breast, belly, and wings chestnut. This and the preceding species are said to fly in flocks, led by a king who flies higher than the rest.—The *P. rubra*

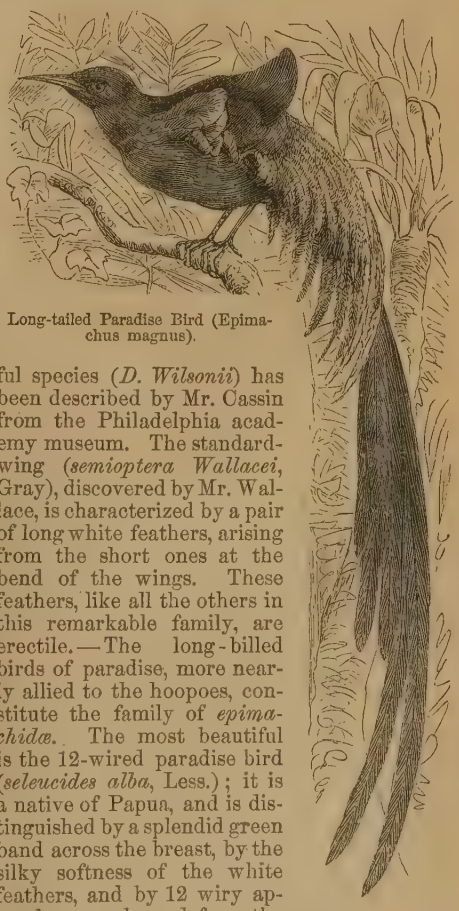
(Vieill.) is about 9 inches long, and principally characterized by the fine red color of the subaxillary feathers, and the two long, slender, rib-

Gold-breasted Bird of Paradise (Parotia sexpennis).

bon-like shafts.—Since the time of Linnæus the genus *paradisea* has been subdivided into several others. To the genus *cicinnurus* belongs the king paradise bird (*C. regius*), about 7 inches long; it has the head, neck, back, tail, and wings purplish chestnut, with the crown approaching to yellow and the breast to blood-red, all with a satiny gloss; on the breast is a broad bar of brilliant green, below which the belly is white; the subaxillary feathers are grayish white, tipped with shining green; the middle tail feathers are spirally coiled, with the webs of a glossy green color. The superb paradise bird (*lophorina atra*, Vieill.) has a black crest, with the head, hind neck, and back of a greenish gold color, of a velvety appearance, and overlying each other like the scales of a fish; the wings a dull deep black; tail black, with a blue gloss, and even at the

Twelve-wired Paradise Bird (Seleucides alba).

end; throat changeable violet; belly bright golden green; subaxillary plumes black and velvety, rising upon the back and resembling a second pair of wings. The gold-breasted paradise bird (*Parotia sexpennis*, Vieill.) is also crested; the top of the head, cheeks, and throat changeable violet black; fore neck and breast brilliant changeable green; back deep black, with a violet gloss; wings and tail black; the subaxillary feathers are long and black, with loose webs like those of an ostrich; on each side of the head are three long feathers, webless except at the end, where they are spread into an oval form.—Mr. A. R. Wallace, in his "Malay Archipelago," describes and figures 18 species which are called paradise birds. Of these one of the most remarkable is the magnificent bird of paradise (*diphyllodes speciosa*), the generic name being derived from the double mantle which covers the back. It is of a general rufous color above, and of brilliant green below, with a tuft of beautiful yellow feathers on the hind neck, marked at the end by a black spot. A more rare and beauti-



Long-tailed Paradise Bird (Epimachus magnus).

ful species (*D. Wilsonii*) has been described by Mr. Cassin from the Philadelphia academy museum. The standard-wing (*semioptera Wallacei*, Gray), discovered by Mr. Wallace, is characterized by a pair of long white feathers, arising from the short ones at the bend of the wings. These feathers, like all the others in this remarkable family, are erectile.—The long-billed birds of paradise, more nearly allied to the hoopoes, constitute the family of *epimachidæ*. The most beautiful is the 12-wired paradise bird (*seleucides alba*, Less.); it is a native of Papua, and is distinguished by a splendid green band across the breast, by the silky softness of the white feathers, and by 12 wiry appendages prolonged from the plumes on the sides. The long-tailed paradise bird (*epimachus magnus*) has the tail more than 2 feet long, glossed with most beautiful colors,

and broad plumes springing from the sides of the breast. Several other birds, of exquisite plumage, intermediate between the above families, are described by Mr. Wallace.—No description can give any idea of the graceful forms and brilliant hues of the paradise birds; our own beautiful humming birds come nearest to them in fairy-like structure of their plumage, and in the gorgeous, metallic, and ever-changing lustre of their colors.

BIRDS (*aves*), a class of vertebrate biped animals, exclusively oviparous, and with very few exceptions covered with a feathered coat, adapted more or less perfectly for flight. They have frames penetrated through all their parts by air cells, which facilitate motion by imparting lightness. By means of nests, which serve as substitutes for internal organs of reproduction, they develop their young after the exclusion of the ova. The last two peculiarities distinguish birds from all other animals. The families which have not the power of flight are few both in regard to the number and varieties of species, and to the individuals composing them. They are all formed either for motion on the land or in the water exclusively. In all these instances the feathery coverings are incompletely developed, possessing a proximate resemblance to the hairy covering of certain land and water animals. The ostrich and the penguin may be named as typical of these two distinct forms of exception, both in regard to their inability to raise themselves into the air and their exceptional hair-like plumage.—In the internal organization of the entire class of birds there are other and more noticeable anatomic peculiarities. Their skulls are without the sutures that are found in mammalia, forming consolidated bones. These are joined to the neck or spinal column by a joint, so constructed as to give freedom of motion in horizontal and lateral directions, without danger of dislocation or injury. In the place of teeth they have upper and lower jaws, forming unitedly the bill, and composed of a hard horny substance. In several families of birds, as the parrots, the upper part of the bill is articulated with the skull. More commonly the skull and upper jaw are united by means of an elastic bony plate, by the interposition of which the brain is protected from injuries to which it would otherwise be exposed. The upper extremities of birds, homologous with the arms or fore legs of other animals, differ essentially in never being used as prehensile organs, or for motion in contact with the earth, as in walking or running. Their use is almost exclusively for flight, and they serve as the basis of the wings. The cervical vertebræ of birds are more numerous than those of mammals. In the latter their number is uniformly 7, while in birds there are never fewer than 10, and in some instances there are as many as 23. The dorsal vertebræ are more fixed and limited in their motion than the cervical, and are usually 10 in number, rarely 11, and in some instances only 7 or 8. The pelvis in birds is a simple elongated plate, open below, terminated by the rump, which supports the tail feathers.

Parts of a Bird.—1. Skeleton. 2. Nictitating Membrane. 3. Brain. 4. Sternum or Breast Bone.

The breast bone or *sternum* is perhaps the most noticeable feature in the bony skeleton of birds. It is also one of the most important parts of the osseous framework, as it forms the base for the insertion of the most powerful of the muscles of flight. Its prolongation or crest determines with infallible accuracy the degree of power of flight of its possessor, and is entirely wanting in those destitute of the power of raising themselves in the air. The merrythought (*fercula*) should be here mentioned as another peculiarity in birds of flight, and wanting only in those not possessed of that power. The bony framework of the lower extremities comprises a thigh bone, two leg bones, a metatarsal or ankle bone, and the bones of the toes. The last vary in number, and terminate in nails, of greater or less importance in the animal economy, according to the habits of the family possessing them. The variations in the mechanism of the lower extremities are often very curious and striking. The birds which roost, and more especially those which are in the habit of standing long at a time upon one leg, are enabled, by the remarkable arrangement of the bones and the muscles attached to them, to do either with very little effort or fatigue. As might be expected, in birds of vigorous flight we find the pectoral muscles presenting the greatest development. These often exceed all the other muscles in weight and bulk. The great pectoral and the middle pectoral are antagonistic forces, alternately depressing and elevating the wings, while the small pectorals, or third pair, aid in varying the manner and character of the flight. The muscles of the lower extremities vary greatly with the habits of the bird, and especially according

as they are climbers, waders, swimmers, perchers, &c. Besides their muscular integuments, all birds have horny beaks and nails, a fleshy cere at the base of the bill, and scaly coverings to the lower extremities, wherever they are bare. Their peculiar covering, found more or less perfectly in the whole class, and in no other kind of animals, is their plumage. In certain families, as that of the ostrich, the plumage makes a remarkably close approach to the hairy coverings of land mammals. In other families, such as the divers, the alcadæ, the guillemots, &c., the plumage more nearly approaches the furry coats of the otter and the seal. The plumage of all birds of this order is close, oily, and often glossy, and the skin is moreover covered with a thick layer of down. In the young of birds the proximate resemblance of their plumage to the hairy covering of mammals is even more marked. The bills of birds enable the raptorial families to tear their prey into fragments; they supply to the

1. Digestive Apparatus: *c*, Crop; *g*, Gizzard. *t*, Trachea. *b, b*. Bronchial Tubes. *l, l*. Lungs. 2. Bones of the Wing.

fly-catcher, the swallow, and the whip-poor-will exquisitely contrived insect traps; they give to the woodcock, the snipe, and other waders, the power of determining what is suitable for food, with no other aid than the most delicately sensitive nervous membranes of their long probe-like jaws.—In birds, the alimentary canal comprises an œsophagus, a crop, a membranous stomach, a gizzard, an intestinal canal, and a cloaca, in which the urinary ducts also terminate. The gizzard is a powerful organ in promoting digestion, especially with gallinaceous and other graminivorous birds.—That peculiarity of structure, however, which most fully distinguishes this from every other class of animals, is the immediate and constant connection of the lungs with numerous air cells that permeate the entire frame, extending even throughout the bony portions. These membranous air cells occupy a very considerable portion both of the chest and of the abdomen, and have the most direct and uninterrupted communication with the lungs. The long cylindrical bones are so many air tubes. Even the flat bones are occupied by a cellular bony network, filled with air. The large bills in certain genera, even the very quill feathers when fully developed, receive more or less air from the lungs, at the pleasure of the birds. By these means the erectile crests of a number of species are alternately depressed or elevated. The design of these chains of air cells, penetrating into every portion of the structure of birds, is obvious. Lightness of the body for motion in the air or water, or on the land, is indispensable. Hence we find in birds of the highest and most rapid flight the largest supply of air cells. This pneumatic apparatus is also supposed to assist materially in the oxidation of the venous blood, and the air contained in the cells is presumed to operate upon the blood vessels and lymphatics in contact with them. The volume of air which birds are thus enabled to introduce into their bodies, and the ease and power with which they can at will expel it, taken in connection with their peculiar organs of voice, explain how some of the smallest members of the class, as the common canary bird or the black-poll warbler of North America, are enabled to give utterance to such powerful notes, and to continue them so long without any apparent effort. The construction of the larynx in this class is very peculiar, bearing a remarkable resemblance to certain wind instruments. This organ is made up of two parts, the true *rima glottidis*, at the upper part of the windpipe, and the bronchial larynx, which is furnished with a peculiarly tense membrane, performing the same duty as the reed in the clarinet. The song of birds is the expression of amorous desire. It is confined to the males, and in a state of nature is heard only during the breeding season. Many birds have no power of song. The call of birds, however, is common to both sexes and all species, and is their universal language. Many birds, which are mute in the countries to which they migrate in the winter months, and have the reputation of being entirely voiceless, are clamorous when they breed, as is the case with the European woodcock (*scolopax rusticola*), and the jacksnipe, or judcock (*scolopax gallinula*). Some birds are known by their clang of tongues in their migrations, clamoring in order to regulate their squadrons, as wild geese, cranes, and many of the waders, which rise voiceless when they are alarmed by the sportsman, and feed in the daytime silent. Others are, so far as we know, silent at all times, except when they spring upon the wing, in any sudden alarm. Some again, as the passenger pigeons, make their migrations in silence, take wing in silence when alarmed, yet when alone in the woods make the solitudes sonorous; others, like rooks, are habitually noisy, especially in the breeding season, yet rise in

flocks without sound or signal. In some species which do not sing, there is an amatory call which answers the purpose of song, peculiar to the male bird during the season of the female's incubation, as the clear double whistle of the American quail, the cry of the cuckoo, the cooing of the dove, the harsh craik of the land-rail, and the *kek-kek-kek* of the male of the English snipe, as it is falsely called in the United States (*scolopax Wilsonii*), which is either discontinued, or changed into something different, when the season and the desire for reproducing their species have passed away. As a general rule, aquatic fowl are more noisy than land birds, sea fowl than fresh-water birds, nocturnal than diurnal birds, domesticated fowls than those in a state of nature, birds which congregate than those of solitary habits, and, with the exception of common poultry, migratory birds, which pass much of their time on the wing, than those which dwell on the ground. Nevertheless, while some sea birds which congregate are deafening in their clangor, they fly totally independent one of the other, not regulating their movements by signals of any kind; others, as many varieties of the *tringæ*, *scolopacidæ*, and *charadriadæ*, while they utter no sounds, yet wheel as regularly and orderly, in obedience to some concerted signal, as a well disciplined regiment of horse. And again, while some migratory birds are vociferous in the extreme, others are totally silent, and some non-migratory species, such as jackdaws and rooks, exceed all others in fondness for their own voices.—The large proportionate development of the brain and of the nervous system of birds is another distinguishing feature of their organization. In many cases they exhibit an apparent superiority to the corresponding organs in mammalia of the same relative size and weight. Thus, for instance, while in man the size of the brain in proportion to that of the whole body varies from $\frac{1}{2}\frac{1}{5}$ to $\frac{1}{3}\frac{1}{5}$ part, that of the common canary bird is $\frac{1}{1}\frac{1}{4}$. There are, however, great variations in this respect in different families and even in different genera of the same families. Thus, while the brain of the goose is $\frac{1}{8}\frac{1}{6}\frac{1}{0}$ of the entire body, that of the eagle is $\frac{1}{2}\frac{1}{6}\frac{1}{0}$, and that of the common European sparrow is $\frac{1}{2}\frac{1}{5}$. It differs chiefly from the same organ in mammalia in the presence of certain tubercles corresponding to the *corpora striata* of other animals, and the absence of several parts found in the brains of the latter.—The senses of sight, smell, and hearing are supposed to be most acute in a large proportion of the families of the class, much more so than that of taste, which is found well developed in only a few families, and still more than that of touch, which is presumed to be totally wanting. The organs of sight are of great proportionate magnitude, and occupy a large proportion of the cerebral developments. They are constructed with a wonderful contrivance not inaptly compared with so many peculiar kinds of "self-adjusting telescopes." They are also all provided with a very curious apparatus called the nictitating membrane. This is a fold of the *tunica conjunctiva*, so arranged as to be capable of being drawn out to cover the eye like a curtain, and to be withdrawn at will, enabling the possessor to meet the brightest rays of the sun undazzled by its brilliance, and protecting the organ from injuries. With only a few exceptions, birds have no external organs of hearing corresponding to an ear. We find instead the aperture called *meatus auditorius*. The internal membranes of this organ are connected with each other by means of the air cells of the skull, and have but a single auditory bone. Among different authors there is much diversity of opinion in regard to the development of the sense of smell in birds. The experiments of Audubon and Bachman would seem to prove that, even in those families in which this sense is presumed to reach its highest point of perfection, the members are directed by sight rather than by smell to their prey. Still it is quite certain that they possess certain nervous developments corresponding to olfactory organs, which, if not designed for smell, possess no very apparent purpose. The sense of taste has a limited degree of development in a few families, such, for instance, as the divers, the waders in part, and the several families of humming birds, honey-suckers, and a few others. As a general rule it is very imperfect, or even wholly wanting. (For the character of the earliest birds, see ARCHÆOPTERYX, and FOSSIL FOOTPRINTS.)—The various contrivances and instinctive expedients, by means of which the entire class of *aves* develop the germs of their mature or perfect ova, are remarkable as well as distinguishing features in the economy of their propagation. They are peculiar to the class, and are without any known exceptions. They are shared with them by no other class of animals, with only occasional but remote approximations, apparent exceptions rather than real. Every individual of the entire class deposits the matured egg without any distinguishable development of the young bird. Lightness and buoyancy of body, whether for flight in the air or for freedom of motion on land or in water, are essential prerequisites in the animal economy of all the various families of the class. So, to nearly the same extent, is also their abundant reproduction. The vast numbers of their enemies, and the many casualties to which they are exposed, render a large and constant propagation necessary for their preservation. It is quite evident that any habit at all corresponding with the gestation of viviparous animals would be inconsistent with both of these requirements. It would destroy lightness of body, prevent freedom of motion, expose to innumerable dangers from enemies, hinder from procuring food, and make fecundity an impossibility. Thus the common quail or partridge (*ortyx Virginiana*) of the Atlantic states has been known to have

36 eggs in a single nest. Before maturity the product of this nest exceeds in weight their parent at least 20 fold. To provide for these, or but one of them, by internal organs of development, would be impossible. The nests correspond in their uses to the uterine organs of reproduction of mammalia, and yet more to the marsupial pouches of certain Australian quadrupeds. They serve as external organs indispensable to the development of the immature young, from the first appearance of the germ in the egg to a maturity more or less advanced, and varying greatly with the family; from the ostrich that comes into the world able to shift for itself from the very shell, to the blind and naked offspring of other families that are utterly helpless when first hatched. For this development of the young birds there are two essentials—the external receptacle which, though not always with exactness, we call nests, and the application of a certain nearly fixed or uniform amount of caloric. In nearly all cases the latter is generated by contact with the bodies of the parent birds. In some it is aided by the heat of the sun. In a few instances it is effected by heat derived from vegetable decomposition, or from the sun's rays, without any parental intervention after the deposition of the egg.—Attempts have been made, with partial success, to classify the various architectural contrivances, or their substitutes, to be found connected with the nesting and incubation of birds. According to the system of Prof. James Rennie of King's college, London, the entire class are ranged in 12 groups: miners, ground builders, masons, carpenters, platform builders, basket makers, weavers, tailors, felt makers, cementers, dome builders, and parasites. The objections to this arrangement are, that it is imperfect in itself, and that it corresponds to none of the usual systems of ornithological classification. The large number of species which, without being miners or carpenters, invariably occupy for their nests corresponding sites, namely, holes in the earth or hollow trees, have no appropriate place. Some of these have been improperly classed as parasites. Nor is there a well defined place for the large variety of species belonging to every order which resort to the bare ground, making no perceptible nest, or for that remarkable family of Australian birds, the mound builders, which combine something both of the miner and the ground builder. It seldom if ever conforms, in a single family even, with any known classification. Thus, the hawks are platform builders, ground builders, occupants of hollow trees, &c.; the swallows are miners, cementers, dome builders, masons, &c.—The mining birds compose a very large group, belonging to nearly every order, and having no other common peculiarity. They may be divided into two well marked subdivisions: the true miners, which excavate holes for themselves, in which they construct their nests; and those which, without mining, occupy sites precisely similar. Of these a portion are supposed to be parasitic, availing themselves of the labors of others. Among the true miners may be named the common bank swallow, found nearly throughout the habitable globe, the bee-eaters of Europe and Asia, and the whole genus known as storm petrels or mother Carey's chickens; as also the several genera of puffins, kingfishers, penguins, &c. Among miners only by occupancy may be named the wood wren and the winter wren of North America, the black guillemot, and the burrowing owls of North and South America. The last are parasitic miners, occupying invariably holes dug by other animals.—The ground builders include by far the largest group of birds of every order, and nearly of every family, and cannot be defined with exactness. In it must be classed many which build no nest; others that do or do not construct nests, according to circumstances; those which build on the ground usually, but frequently elsewhere; some that are usually ground builders, but at times true miners, like the skylark of Europe, &c. The nighthawks and whip-poor-wills of America make no nest, the former depositing their eggs upon the bare earth, always selecting a site corresponding in color to their eggs, the latter selecting dried leaves as better suited to the same purpose of concealment. A very large proportion of the shore birds, waders, gulls, &c., make use of the bare sand, with only a slight excavation for a nest. Others of the same species are more painstaking, and construct well formed nests. The herring gulls usually build a slight nest on the ground, but, after having been repeatedly robbed by eggers, the same birds are known to construct large and elaborate nests in trees or on precipitous cliffs. The mound builders of Australia (see Brush Turkey) combine in part the habits of the miners with those of the ground builders, in a manner peculiar to that remarkable family. Among the true ground builders may be cited nearly all the vultures, the entire sub-family of *circidæ* or hen-harriers, the *zonotrichiæ* or song sparrows of America, nearly all the waders, ducks, geese, swans, gulls, terns, &c., with more or fewer representatives in every order.—The birds classed as masons are comparatively few in number of species. They are so called because they construct their nests, in whole or in part, with walls, coverings, barricades, &c., of mud or clay. Of this class the cliff swallow of North America is one of the most remarkable examples. The house swallows both of Europe and America, the thrush and blackbird of Europe, the robin and the pewit flycatcher of North America, are among the most familiar examples. The baker bird of South America, the most skilful and remarkable of this class, constructs a nest in the most exposed situations, but at a considerable height, hemispherical, or in the form of a baker's oven. The opening of this nest is lateral, and is twice as high as it is wide, and the interior is divided

into two chambers by a partition beginning at the entrance.—The true carpenters are also a comparatively small group, consisting of those which excavate by their own labor holes for their nests in trees. The large and widely distributed family of woodpeckers are the most familiar examples of the carpenter bird. With them are also classed the toucans of South America, the tomtits, the wrynecks, and the nuthatches. Among the more common examples of the birds which, without being true carpenters, resort to similar places for their nests, may be mentioned the sparrowhawk, the bluebird, the purple martin, the white-bellied swallow, and the house wren of North America, several species of owls, and many other. —The platform builders are a small but distinct class, embracing most of the hawk tribe, the wood pigeons, the cuckoos of America, &c. All the eagles are true platform builders, and many of them construct elaborate and remarkable nests. The nest of the white-headed eagle is a massive structure, sometimes forming an exact cube five feet square. The martial eagle of southern Africa also constructs a large platform, said to be able to support the largest man. These nests are perfectly flat, with no other security against the eggs (always few in number) rolling off than the constant presence of one of the parents. The common passenger pigeon, the turtle dove, and the yellow-billed cuckoo of North America are the most familiar examples of this class; as also in Europe are the wood pigeons, the ringdoves, the herons, and the storks.—Another larger class, whose architectural accomplishments are even more remarkable, are the basket-makers. Many of these exhibit an elaboration and an ingenuity beyond the power of human skill to imitate. The vireos of North America weave a cup-shaped basket nest, pendent from some convenient twig, the leaves of which conceal them from enemies. The European bullfinch, the American mocking bird, the red-winged blackbird, the yellow-headed troopials of North America, the ravens, crows, and magpies, and the *cyanotis omnicolor* of Chili, may be mentioned as among the more familiar or remarkable of this interesting group. The last-named bird attaches a nest of singular beauty and elaborateness to the stems of the large reeds of that country, constructed to resemble so closely the ripened seed vessels of the plant as to deceive even the most wary. The locust-eating thrush of southern Africa builds a large basket fabric, containing many cells or separate nests, from 6 to 20 in number, the joint products of and occupied by as many pairs. The pensile grossbeak swings its basket nest from a pendent twig over a running stream, and makes its entrance from the bottom. The sociable grossbeaks unite in the construction of a large, basket-like cluster of nests, sometimes containing 200 or 300 in a single structure. The weavers are closely allied to the preceding class, differing chiefly in their more pensile nests, and in the superior nicety of their structure. The weaver oriole of Senegal is one of the most remarkable of this class. The Baltimore oriole of America, the Indian sparrow of southern Asia, the crested fly-catcher of southern Africa, and the yellowhammer of Europe, are among the more familiar and distinguishing instances of the weavers. Hardly distinguishable from the two preceding groups are the few species classed as tailors. The orchard oriole of America is hardly entitled to be so classed, though usually quoted as a true tailor. The best known instance is that of the *sylvia sutoria* of the eastern continent, which sews a dead leaf to a living one, and between them constructs its tiny nest. The blue yellow-back warbler of America is another remarkable tailor, though its wonderful skill is as yet little known or appreciated.—The felt makers form quite a large and well marked group of artificers among birds. These arrange the materials of their nests, though more loosely, in the same manner as that in which are put together the fibres of felt. These materials are, to all appearances, corded together. How this is done cannot be satisfactorily explained. The chaffinch of Europe, the goldfinch of America, the canary bird, and the whole family of humming birds, may be given as exemplifications of this peculiar and interesting group.—The cementers compose a very small but well distinguished class, all the members of which, so far as is at present known, belong to the family of swallows. These birds secrete, from glands on each side of the head, a strongly adhesive glue, which is dissolved in their saliva, and with this unite the materials of their nests, and fasten them to their proposed sites. The chimney swallow of North America is the most familiar example of this group, while the esculent swallow of the East is the most remarkable.—The dome builders might without inconvenience be merged in the several groups of weavers and basket-makers. They consist of a large number of species belonging to a great variety of families, which construct covered nests, entered by holes in the side. These nests are more common in tropical than in cold countries. The marsh wrens, several of the *sylvicolæ* (as the Maryland yellow-throat), the golden-crowned thrush or oven bird, the meadow lark, and the quail, of North America, are among the most familiar representatives of this group on this continent. In Europe it embraces the common wren, the chiff-chaff, the hay-bird, the wood wren, the sparrow, the magpie, and the bottle-tit, among its best known members.—The last group is one which it is not easy to classify. The true parasites, those which, like the cuckoo of Europe, the cow blackbirds of North America, and its congener of South America, never rear their own young, but intrude their offspring upon strangers, always laying their eggs in the nests of other species, are a small but well marked class. The larger number which resort to the

chosen sites of other birds, but build their own nests and rear their own young, are less clearly defined, because they are not uniformly parasitic in their habits. Of this latter class, the house sparrow of Europe as often makes its own nest as it seizes upon that of another species. Nearly or quite all of this class, usually marked as parasites, are so only occasionally, and by force of circumstances. The true members of the group are not many, and, so far as is at present known, are confined to the two genera *cuculus*, or true cuckoos, and *molothrus*, or cow birds.—According to Mr. A. R. Wallace, birds' nests may be divided into two classes: those which are exposed or imperfectly concealed, and those which are covered, or so placed that the sitting bird is effectually hidden. Birds may also be divided into two groups, according to the difference of coloration in the sexes: in some species varied and brilliant colors occur in both sexes; in others, a more numerous class, the male is brighter than the female. With but few exceptions, Mr. Wallace finds that birds of conspicuous color build concealed nests, while in species where the female is dull the nest is fully exposed. Among American birds in which the females are bright and conspicuous, and which accordingly conceal their nests, or make them of a color to deceive, or of a form or depth to hide the sitting bird, are: the kingfisher, woodpecker, Carolina parrot, Baltimore oriole, humming birds, magpie, many bright warblers, sparrows, and finches, meadow lark, Zenaida dove, wild turkey, quail, Canada, pennated, and willow grouse, and summer duck. Among our birds in which both sexes are dull, and a concealed nest unnecessary, are the thrushes and orioles, and the passenger pigeon. Among those in which the male is bright and the female dull are the yellow-breasted warbler, goldfinch, grossbeaks, scarlet tanager, redstart, bobolink, red-winged blackbird, kingbird, many flycatchers, and the ruffed grouse. Another interesting coincidence is that in the concealed or concealing nests, the eggs, as a general rule, are white, as with the owls, swallows, kingfishers, woodpeckers, humming birds, quails, and doves.—See "Proceedings of the British Association for the Advancement of Science," for 1867, and "Proceedings of the Boston Society of Natural History," vol. xi., pp. 319–321, 1867. (For the systematic classification of birds, and the history of the science, see ORNITHOLOGY.)

BIRD'S NEST, Edible, the nest of the sea swallow of the Malay archipelago, called *lawit* in Java and *salangane* in the Philippines (*hirundo esculenta*). The bird is uniformly dark-colored, inclining to green on the back and blue on the breast, has a short, strong bill, broad at the base, and is a little smaller than our swallow martin. It gathers from the coral rocks of the sea a glutinous weed or marine fucus, which it swallows and afterward disgorges, and then applies this vomit with its plastic bill to the sides of deep caverns, both inland and on the seacoast, to form its nest. When complete the nest is a hollow hemisphere, of the dimensions of an ordinary coffee cup. When fresh made it is of waxy whiteness, and is then esteemed most valuable; of second quality, when the bird has laid her eggs; and of third, when the young are fledged and flown. The lawit frequents mostly the deep, surf-beaten caves of the S. coast of Java, principally those of Karang Bollong (hollow reefs), in the province of Baglen. These caves open at the base of a perpendicular face of rock, nearly 500 ft. high, the mouths being from 18 to 25 ft. in breadth and 30 ft. in height; within they continue to expand, until they attain the dimensions of from 100 to 120 ft. in width and 450 ft. in height, and for many hundred feet within the waves break with terrific fury. The collectors of the nests are lowered over fearful chasms, and move along a slippery foothold, at the risk of instant destruction. The collections take place in April, August, and December. These nests are also obtained in other parts of Java, and the islands eastward, on the coasts of Borneo, and in the limestone caves of the Philippines. The whole product of Java and Netherlands India, which is a government monopoly, is 40,000 or 50,000 pounds annually, worth from $5 to $35 a pound; some of the finer sorts sell in Chinese markets for twice their weight in silver. It is well known that the edible nest is a whimsical culinary fancy of the Chinese alone; they use it in the preparation of their most refined soups. Alone it has an insipid glutinous taste. The Chinese attribute to it peculiar strengthening qualities; but this sensual people chiefly prize it for its alleged properties as an aphrodisiac.

BIRKENFELD, an outlying principality belonging to the grand duchy of Oldenburg, Germany, surrounded by the Rhenish Prussian districts of Treves and Coblentz; area, 194 sq. m.; pop. in 1871, 36,128, of whom 7,300 were Roman Catholics. The soil is poor, though well cultivated wherever practicable. The surface is covered with forests and mountains. The principality possesses iron mines, and produces agates, chalcedony, &c., which are wrought for exportation. It has a market town of the same name, 23 m. E. S. E. of Treves; pop. 2,249. The principality was from early times a separate state under the suzerainty of the palatines of Deux-Ponts. In 1802 it came into possession of France, and in 1815 of Prussia, which in 1817 ceded it to Oldenburg.

BIRKENHEAD, a market town and port of Cheshire, England, on the estuary of the Mersey, opposite Liverpool, with which it has constant communication by several steam ferries; pop. in 1871, 65,980. A railway 16 m. long connects it with Chester, whence other roads diverge to various parts of the kingdom. Although a place of considerable antiquity, having been founded at least as early as the 12th century, it dates its present prosperity from a

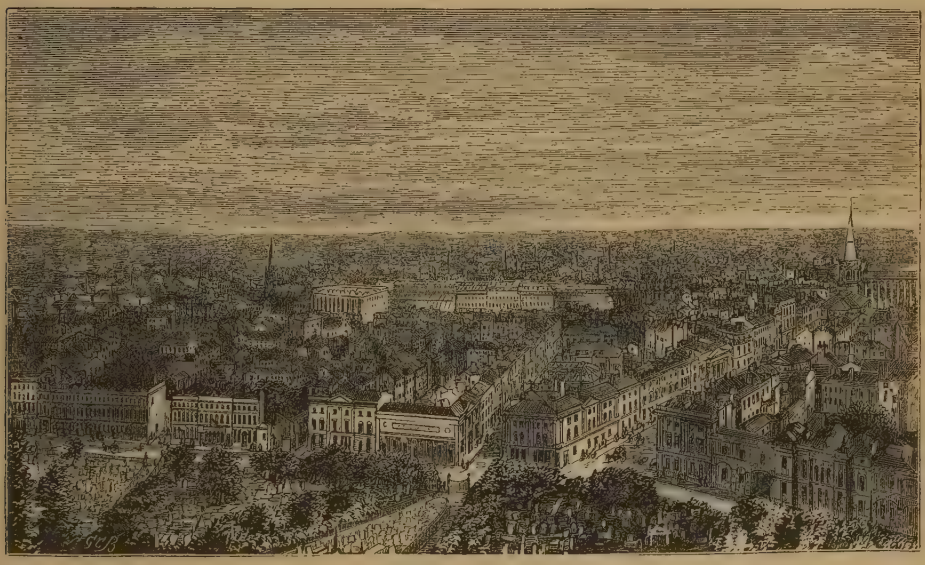
very recent period. Originally a poor fishing village, numbering in 1818 scarcely 50 inhabitants, it grew with a rapidity seldom witnessed in the old world, and its population has nearly trebled since 1851. This increase is mainly owing to its docks. In 1824 large ship-building docks were erected on Wallasey pool, on the N. W. side of the town, and in 1844 a series of splendid works, embracing a sea wall from Woodside to Seacomb, docks at Bridge-end, a tidal basin, and a great float with a minimum depth of 22 ft., were commenced. The first dock was opened in 1847. The principal works now include two gigantic wet docks or floats on Wallasey pool, embracing with subsidiary basins a water area of 165 acres, with 10 or 11 m. of quays, and three graving docks with a length of 1,928 ft. Other immense works have been planned; but the original undertakers of the Birkenhead docks were heavy losers by the speculation, and the unfinished structures were bought and continued by the corporation of Liverpool. Warehouses on a large scale have been erected in connection with the docks. The town is well laid out, well lighted, paved, and drained, and well supplied with water. The streets are wide and regular, the main thoroughfares, five in number, running nearly east and west, and the shorter streets crossing them at right angles. On Conway street, one of the principal avenues, is a public park, with an area of 180 acres. A market 430 ft. long by 131 ft. wide, is a notable feature of the town. There are numerous churches and chapels, a theological college (St. Aidan's, established in 1846), a court house, gas and water works, an infirmary, a mechanics' institute, and many free schools in connection with the different churches and chapels. There is no custom house, the entries being made at Liverpool. Manufactures are carried on with activity, and embrace pottery, varnish, boilers, guns, &c. There are also extensive iron founderies. Birkenhead returns one member to the house of commons.—A priory was founded here by Harris de Massey in 1150, and richly endowed. It was occupied by the royalists in 1644, and taken from them by the parliamentary troops. In 1843 it was demolished, and nothing now remains but a portion of the gable and one Gothic window, which formerly belonged to the refectory.

BIRKENHEAD, Sir **John,** an English satirical and political writer, born at Northwich, Cheshire, 1615, died in Westminster, Dec. 4, 1679. He was educated at Oxford, and appointed secretary to Archbishop Laud. In 1642 he commenced the publication of the "Mercurius Aulicus" or court journal, through which during the civil war the court communicated with the rest of the kingdom. He satirized the Presbyterians in "The Assembly Man" (1662–'3), and wrote also "Two Centuries of St. Paul's Churchyard" (1649), "The Four-legged Quaker," &c. He was persecuted during the commonwealth. At the restoration he was knighted and received several offices.

BIRKET-EL-KEROON (Arab., lake of the horn), a lake in Fayoom, central Egypt, so named from its shape, or perhaps from the shape of the projecting spouts of a castle which stands on its banks; length about 30 m., greatest breadth 6 m. Its shores are bluff, except on the S. side, where they are low and sandy. The lake communicates with the Nile and with the canal which popular tradition ascribes to Joseph. In antiquity it was connected by canals with the artificial lake Mœris, with which it has often been erroneously identified. (See Mœris.) It abounds with fish, and is farmed out to fishermen.

BIRMINGHAM, a manufacturing and market town, municipal and parliamentary borough of Warwickshire, England, 17 m. N. W. of Warwick and 100 m. N. W. of London; pop. in 1851, 232,841; 1861, 296,076; 1871, 343,696. It is situated in the N. W. portion of the county, and stands on undulating ground sloping down to the river Rea. The railway lines centring here are the London and Northwestern, the Great Western, the Midland, the Birmingham and Oxford, the Birmingham, Dudley, and Wolverhampton, and the Birmingham, Wolverhampton, and Shrewsbury. Several canals, radiating from Birmingham, communicate with other towns and with the mines in the vicinity. The town is divided into 13 wards, and its government is administered by a mayor, recorder, 15 aldermen, and 48 common-councilmen. There are three public parks, viz.: Adderley park, triangular in shape and prettily laid out, which was opened in 1856; Calthorpe park, near the Rea, opened in 1857; and Aston People's park, dedicated in 1858, which contains 43 acres and is covered with fine trees. The older portion of the town is on low ground, and exhibits some good specimens of ancient domestic architecture, while the modern portion, on high ground, contains many fine and costly buildings, principally of brick, and spacious streets. The town hall, of brick, faced with Anglesea marble, 160 ft. long, 100 ft. wide, and 83 ft. high, is built on the model of the temple of Jupiter Stator at Rome; and the public hall, 145 ft. long, 65 ft. wide, and 65 ft. high, contains one of the most powerful organs in England, with 4,000 pipes and 78 stops. The free grammar school was founded by Edward VI. Its present building, a beautiful structure, erected in 1834 at a cost of £50,000, is 174 ft. in front, 125 ft. deep, and 60 ft. high. The school contains a classical and a commercial department, and has an income of £12,000 a year. There are about 470 pupils in the main establishment, and 1,000 in the four branches that have been established for the children of artisans, &c. The parish church of St. Martin, a very ancient edifice, with a massive tower and handsome spire 210 ft. high, recently rebuilt, contains some curious monuments of the De Berminghams, the ancient lords of the place.

St. Philip's church, erected in 1715, but lately repaired, is a fine structure in the Italian style, with a tower surmounted by a dome and cupola. There may also be mentioned St. George's church, in the decorated English style; St. Thomas's, a Doric structure; the Roman Catholic cathedral, erected at a cost of £60,000; the London and Northwestern railway station; Queen's college, which confers degrees in arts, law, and medicine; the Midland institute, a philosophical institution; the exchange buildings, the masonic and odd fellows' halls, &c. Besides the free grammar school and Queen's college, the most noteworthy educational institutions are the blue-coat school, giving elementary instruction to 140 boys and 60 girls; the Protestant dissenters' charity school, educating 40 girls; St. Philip's industrial free school, admitting 220 children; Springhill college, a theological institution of the Independents; Sydenham medical college; and the government school of design. In the vicinity of Birmingham are the Roman Catholic seminary of Oscott, and a diocesan training institution at Saltley. There is a public subscription library in the town, containing 30,000 or 40,000 volumes, a society of arts, an odd fellows' literary institute, free libraries erected by the corporation, and two reformatory institutions. Of the charitable institutions, the most important are the general hospital, Queen's hospital, the deaf and dumb asylum, the institution for the blind, and various dispensaries and infirmaries. There are 34 churches belonging to the establishment, a Roman Catholic cathedral and three or four chapels, and numerous places of worship for dissenters. There are two theatres, three music halls, an art gallery, and three



Birmingham, England.

cemeteries. Birmingham has a branch of the bank of England and six other banks, on the joint stock principle. The savings bank, which was one of the largest in England, has been merged in the post office system.—The town owes its rapid growth and great prosperity to the extent and variety of its manufactures. Situated near the centre of England, on the border of a great coal and iron district, with an admirable canal and railway system, it has enjoyed unrivalled advantages. Birmingham has been known for centuries for its iron and steel manufactures, but it has attained its present preëminence within this century. While there are many extensive establishments, employing a large capital, yet a great proportion of the manufacturing is carried on by men of small means, who generally employ their workmen by the piece. The latter frequently work at home, and when they require the aid of machinery hire one or more rooms, furnished with steam power, in buildings which are kept for that purpose. In 1865 the number of steam engines in the town was 724, with 9,910 horse power, consuming 600 tons of coal daily. There were 1,013 smelting and casting furnaces at work, and 20,000 families were engaged in manufactories. The value of hardware and cutlery exported in 1864 was over £4,000,000. At the same time the exports of firearms, glass, leather, machinery, iron and steel wire, plate, copper, brass, zinc, tin, and coal amounted to over £37,000,000. Of firearms 5,000,000 were furnished during the Napoleonic wars, and during two years of the American civil war 1,027,336 were exported to the United States. Besides glass manufacturing, glass painting or staining is an important branch of industry.

The quantity of gold ware assayed and marked at the assay office averages 30,000 ounces annually; of silver ware, 100,000. Large quantities are also manufactured and sold without being marked. Large numbers of gold rings are produced, nearly 30,000 wedding rings having in some years been assayed and marked at the assay office. About 300,000 ounces of silver-plating are consumed yearly. The manufacture of steel pens is very important. The establishment of the late Mr. Gillott employs 500 workmen and manufactures 1,000,000 gross annually. The whole number of steel pens made yearly in Birmingham is estimated at 900,000,000, consuming 500 tons of steel. Pins and buttons are also made in vast quantities, and several hundred tons of mother-of-pearl are annually consumed in the latter manufacture. The manufacture of swords and bayonets is also extensively carried on. At Smethwick in the vicinity of Birmingham steam engines are largely made. Many hands are employed in japanning and electro-plating. An important branch is the manufacture of fancy seals, brooches, clasps, and other trinkets, of what is known as Birmingham gold, as well as of polished steel. There may be mentioned in addition, among the industries of Birmingham, wire-drawing, scale making, railway carriage building, brass founding, iron casting, works in bronze, and manufactures of lamps, metallic bedsteads, gas fittings, leather and wood cases, nails, articles of papier maché, tools, percussion caps, and sewing machines. The machinery employed in the various manufactures is remarkable for the combination of power with delicacy and precision of movement. There are two annual fairs, each lasting three days, one in the spring, the other in autumn.—Birmingham is first mentioned in Doomsday Book, under the name of Bermingeham. It remained an obscure village for centuries. The first great impetus was given to its growth toward the close of the last century by the introduction of the steam engine and the demand for muskets created by the American revolution and the French wars. A still greater accession of strength and prosperity has been received in the last 40 years from the railway system. Birmingham was constituted a borough by the reform act of 1832, with the privilege of sending two members to parliament; an additional member was given by the act of 1867. The municipal charter was granted in 1838.

BIRMINGHAM, a manufacturing village of Connecticut, in Derby township, New Haven county, on an eminence at the junction of the Housatonic and Naugatuck rivers, 11 m. W. of New Haven; pop. in 1870, 2,103. It is neatly laid out, and contains a number of churches and schools, most of which face a handsome public square in the centre of the village. The first considerable pin factory in the United States, established in New York in 1836, was transferred to this place in 1838. There are rolling mills for copper, iron, and steel, factories of carriage springs and axles, bolts, augers, well chains, tacks, and other articles, and lumber and coal yards. A bridge across the Naugatuck connects Birmingham with Derby, which is a station on the Naugatuck railroad, and has steamboat communication with New York.

BIRMINGHAM, a borough of Allegheny county, Penn., on the S. bank of the Monongahela, about 2 m. above its confluence with the Alleghany; pop. in 1870, 8,603. It is a suburb of Pittsburgh, with which it is connected by a steam ferry and a suspension bridge 1,500 feet long. It has important manufactories of iron and glass, and several breweries. East Birmingham, with 9,488 inhabitants, adjoins it on the east.

BIRNAM, a hill of Perthshire, in the western highlands of Scotland, near the S. bank of the Tay, 14 m. N. N. W. of Perth, 1,324 ft. high. It was anciently included in a royal forest, and is mentioned as Birnam wood in Shakespeare's "Macbeth." It is now destitute of trees.

BIRNEE, Old, the capital of the kingdom of Bornoo, in central Africa, 70 m. W. of Kuka, on the Komadugu Waube; pop. about 10,000. It is said to have formerly had 200,000 inhabitants. The ruins of the stone walls by which it was enclosed are still visible.

BIRNEY, James G., an American politician, born in Danville, Ky., Feb. 4, 1792, died at Perth Amboy, N. J., Nov. 25, 1857. He graduated at the college of New Jersey in 1812, studied law, and removed early to Alabama, where he practised law at Huntsville, held the office of district attorney, and was a member of the legislature. In 1833 he interested himself in the organization of a branch of the colonization society for the state of Alabama. Soon afterward, returning to Kentucky, and becoming a professor in the university at Danville, he organized a colonization society there also, of which he became president. In 1834 he espoused the cause of immediate emancipation in a public letter, at the same time emancipating all his own slaves, about 20 in number. He subsequently removed to Cincinnati, where he began to issue "The Philanthropist," an anti-slavery newspaper, which met with much opposition. Its office was repeatedly sacked and its presses destroyed by mobs. About the year 1836 he went to New York, as secretary of the American anti-slavery society, and for many years devoted himself to the furtherance of the object of that society, by letters, articles in the press, and public addresses. He took an important part in the organization of the "liberty party," by which during his absence in England he was nominated in 1840 for the presidency. He was again nominated by the same party in 1844. Previous to this, in 1842, Mr. Birney had become a resident of Michigan, where he was disabled, by a fall from his horse not long afterward, from taking an active part in politics.—His son, DAVID BELL, born at Huntsville,

Ala., May 29, 1825, practised law in Philadelphia, and during the civil war distinguished himself as a brigadier and major general of volunteers in the army of the Potomac, particularly at Yorktown, Williamsburg, and the battles before Richmond, and at the second battle of Bull Run. He died in Philadelphia, Oct. 18, 1864.—Another son, WILLIAM, entered the army as captain at the beginning of the war, rose to the rank of major general of volunteers, and now (1873) lives in Florida.—A third son, the youngest, FITZ HUGH, died in the service with the rank of colonel.

BIRON. I. Armand de Gontaut, baron, afterward duke de, a French general, born about 1524, killed July 26, 1592. He was educated among the pages of Margaret, queen of Navarre, served in Piedmont under Marshal Brissac, distinguished himself during the religious wars in the Catholic army, fighting at the battles of Dreux, St. Denis, and Moncontour, and was created grand master of artillery in 1569. He was suspected of a secret inclination to Protestantism, and owed his safety on the eve of St. Bartholomew to his precaution in shutting himself up in the arsenal. He negotiated with the Huguenots the peace of St. Germain, received the baton of marshal of France in 1577, held various commands in Guienne and the Low Countries, was one of the first to recognize Henry IV., contributed to the victories of Arques and Ivry, and was killed at the siege of Épernay. He was the godfather of Cardinal Richelieu. **II. Charles de Gontaut,** duke de, son of the preceding, a French general, called the "lightning" of France, born in 1562, beheaded July 31, 1602. His valor was distinguished at the battles of Arques and Ivry, at the sieges of Paris and Rouen, of Amiens and La Fère, and in the encounter at Aumale. He was made admiral of France in 1592, marshal in 1594, governor of Burgundy in 1595, duke and peer in 1598, and was ambassador to the court of Elizabeth of England and to the Swiss cantons. Notwithstanding the favors bestowed upon him by Henry IV., excited by mercenary motives, he plotted with Savoy and Spain for the dismemberment of France. His intrigues were discovered by the king, who pardoned him once, and even after he renewed his treason Henry was disposed to indulgence, provided he would confess and repent of his crime. Biron, however, denying everything, was committed to the Bastile, and speedily condemned and executed. **III. Armand Louis de Gontaut,** duke de, born in Paris, April 15, 1747, executed there, Dec. 31, 1793. He is better known as the duke de Lauzun, which was his title till 1788, when he succeeded his uncle as duke de Biron. In 1778 he published a pamphlet on the state of defence of England and its foreign possessions, and was placed in command of an expedition against the British colonies of Senegal and Gambia, Africa, which he reduced early in 1779. Having squandered his fortune, he joined Lafayette in 1780 in America, and in July, 1781, commanded an unsuccessful expedition designed to capture New York from the British. He took part in the siege of Yorktown, and was present at the surrender of Cornwallis. In 1789 he was chosen by the nobility deputy to the states general, and afterward accompanied Talleyrand in his mission to England. In July, 1792, he was appointed general-in-chief of the army of the Rhine, and in May, 1793, of the army of the coast at La Rochelle. He captured Saumur, and defeated the Vendeans; but being accused of incivism for having twice offered his resignation, and for his leniency toward the Vendeans, he was brought before the revolutionary tribunal of Fouquier-Tinville, and condemned to death on the charge of having conspired against the republic.

BIRON (originally BIREN or BÜHREN), **Ernest John,** duke of Courland, born in 1687, died Oct. 28, 1772. The grandson of a groom, he entered as equerry the household of Anna Ivanovna, niece of Peter the Great, and became her favorite and lover during her reign in Courland and residence in Mitau. After Anna became empress, she took him with her to St. Petersburg and made him grand chamberlain. He now adopted the coat of arms and the name of the celebrated French ducal family of Biron. As the favorite of the empress, he ruled absolutely over Russia; and hundreds, if not thousands, were put to death by his command. The nobility of Courland, who a few years before had refused to admit his name in the rolls of their caste, frightened by his ferocity, elected him as their sovereign duke. Named by Anna regent of the empire and tutor of her nephew and successor Ivan during his minority, the ambitious adventurer was suspected of a design to push aside his pupil, and to seize the imperial crown for his own eldest son, marrying him to the grand duchess Elizabeth, daughter of Peter the Great. His reign as regent lasted but a few weeks. As early as 1740, Field Marshal Münnich, once his accomplice, secretly conspired against him, and on the night of Nov. 20 gave orders to seize him in his bed and to put him in irons. He was shut up first in the fortress of Schlüsselburg; then after his condemnation to death in 1741, and the commutation of this penalty into exile for life, he was sent to Pelim in Siberia, and confined in a prison specially prepared for him by the orders of Münnich. The princess Anna Carlovna, mother of the infant sovereign, was proclaimed by Münnich regent of the empire, but was in her turn overthrown in 1741 by Elizabeth, who sent Münnich to Siberia, to replace Biron, whom she recalled from his prison and exile. Biron was ordered to reside in the city of Yaroslav. When Peter III. succeeded Elizabeth in 1762, he recalled Biron to St. Petersburg, and Catharine II. subsequently restored to him his forfeited duchy of Courland. On Jan. 20, 1763, Biron entered his capital of Mitau, and his rule was just and

mild until his death.—He left two sons, the eldest of whom, PETER, succeeded to the dukedom of Courland. Driven thence in 1795, he went to Prussia, where he acquired by purchase several ducal estates, among others that of Sagan. He died on one of his estates in 1800, leaving four daughters, one of whom was known in the political world first as duchess of Dino, and afterward as duchess of Sagan.

BIRR. See PARSONSTOWN.

BIRS NIMRUD. See BABEL.

BIRSTALL, a parish of Yorkshire, England, in the West Riding, 7 m. S. W. of Leeds; pop. in 1871, 43,505. It contains a large number of woollen and worsted mills, besides cotton and silk manufactories, and mines of coal and iron. A branch of the London and Northwestern railroad passes through the parish.

BIRTH. See OBSTETRICS.

BISACCIA, a town of S. Italy, in the province of Principato Ulteriore, 30 m. E. by N. of Avellino; pop. about 6,000. It is built on a hill, has several churches and a hospital, and is the seat of a bishop. Ancient remains discovered here seem to identify Bisaccia as the site of Romulea, captured by the Romans in the third Samnite war.

BISACQUINO, or **Busacchino,** a town of Sicily, 27 m. S. of Palermo; pop. about 8,500. It has an extensive trade in grain, oil, and flax, and manufactures of linen.

BISCAY, one of the Basque provinces of Spain, also called Bilbao, bounded N. by the bay of Biscay, E. by Guipuzcoa, S. by Álava and Burgos, and W. by Santander; area, 848 sq. m.; pop. in 1867, 183,098. It occupies the northern slopes of the E. portion of the Cantabrian mountains. The surface is mostly rugged and wooded, and the climate healthy; the soil, not naturally fertile, is by cultivation made productive. Fruit, Indian corn, and vegetables are raised abundantly, and of the finest quality. The country is principally divided into small farms, in the hands of the owners, who are frequently the descendants of ancient families. The houses are mostly of stone, and many of the old castles and towers have been converted into farm houses. The iron of Biscay is of the first excellence. The great mine of Somorrostro produces about 6,000 tons annually. The chief occupation of the Biscayans, besides agriculture, is fishing and the coasting trade. The chief towns are Bilbao, the capital, Somorrostro, Bermeo, and Orozco.

BISCAY, Bay of, an extensive bay of the Atlantic, N. of Spain and W. of France, the opening of which extends from Cape Ortegal to the island of Ushant. It is about 350 m. long, and 300 in width, being nearly semicircular. It is exceedingly stormy and tempestuous; the whole force of the westerly winds is felt, while the recoil of the waves from the coast causes a very heavy sea. A current sweeps round the inside of the bay, known as Rennell's current, which runs sometimes 26 m. per day. The Spanish coast washed by the waters of the bay is bold and rocky. The French coast is low and sandy as far as the Loire, north of which it is of moderate height. The principal French harbors of the bay of Biscay are Bayonne, Bordeaux, La Rochelle, Nantes, Vannes, Lorient, and Brest; the principal on the Spanish coast are San Sebastian, Santander, and Gijon. The rivers of the north of Spain, which from the contiguity of the mountain chain to the coast are of little size or importance, find their outlet in the bay of Biscay, which receives from France the Loire, the Garonne, and some smaller streams.

BISCAY, New. See DURANGO.

BISCEGLIE, a strongly fortified seaport town of Italy, in the province and 21 m. W. N. W. of the city of Bari; pop. in 1872, 21,371. It is built on a promontory, is the seat of a bishop, and has a cathedral, two monasteries, a hospital, and a college. The harbor admits only small vessels. It is famous for its currants.

BISCHOF, Karl Gustav, a German chemist and geologist, born at Wörd, a suburb of Nuremberg, Jan. 18, 1792, died in Bonn, Nov. 30, 1870. He studied at Erlangen, devoting himself at first to mathematics and astronomy, but soon turned his whole attention to chemistry and the physical sciences. In 1822 he became professor of chemistry at Bonn, and remained such for almost half a century. His principal works are: *Lehrbuch der Chemie* (1816); *Lehrbuch der Stöchiometrie* (1819); *Entwickelung der Pflanzensubstanz* (1819); *Lehrbuch der reinen Chemie* (1824); *Die vulkanischen Mineralquellen Deutschlands und Frankreichs* (1826); *Die Wärmelehre des Innern unsers Erdkörpers* (1837); "Physical, Chemical, and Geological Researches on the Internal Heat of the Globe," written in English (London, 1841). His great work, however, is the *Lehrbuch der chemischen und physikalischen Geologie* (2 vols., 1847–'54, enlarged and revised in 1863; English translation by Paul and Drummond, 1854–'9). His essay *Des moyens de soustraire l'exploitation des mines de houille aux dangers d'explosions* (1840) gained the prize among 14 competitors, offered by the academy at Brussels.

BISCHOFF. I. Christoph Heinrich Ernst, a German physician, born in Hanover, Sept. 14, 1781, died in Bonn, March 5, 1861. He was physician of the general staff of the army in the campaigns of 1813–'15, and from 1819 to 1861 he was professor of medical science at the university of Bonn. A second edition of his principal work, *Die Lehre von den chemischen Heilmitteln*, was published in Bonn in 1838–'40 (4 vols.). **II. Theodor Ludwig Wilhelm,** a German anatomist and physiologist, son of the preceding, born in Hanover, Oct. 28, 1807. He studied in Düsseldorf, Bonn, and Heidelberg, received his doctor's diploma from the university of Bonn in 1832, and became assistant in the midwifery department of that of Berlin. He continued his studies of anatomy and physiology under Ehrenberg and Johann Müller, in 1836 became professor of

comparative and pathological anatomy at Bonn, in 1843 of physiology, and in 1844 of anatomy at Giessen, where he founded a physiological institute and an anatomical museum; and since 1855 he has been professor at the university of Munich. In the trial of Count Görlitz in 1850 he demonstrated the impossibility of spontaneous combustion. His most important contribution to embryology is *Der Beweis der von der Begattung unabhängigen periodischen Reifung und Loslösung der Eier der Säugethiere und der Menschen* (Giessen, 1844). His other works include *Entwickelungsgeschichte des Kaninchencies* (1843), which received an academical prize, *des Hundeeies* (1844), *des Meerschweinchens* (1852), and *des Rehes* (1854). His intercourse with Liebig led to his publication of *Der Harnstoff als Mass des Stoffwechsels* (1853); and in conjunction with his then assistant, Dr. Voit, *Die Gesetze der Ernährung des Fleischfressers* (1859). Among his most recent works are *Die Grosshirnwindungen des Menschen mit Berücksichtigung ihrer Entwickelung bei dem Fötus und ihrer Anordnung bei den Affen* (1866; new ed., 1868), and *Ueber die Verschiedenheit in der Schädelbildung des Gorilla, Chimpanse, und Orang-Utang* (1867).

BISCHOFSWERDA, a city of Saxony, on the river Wesenitz, 19 m. E. N. E. of Dresden; pop. in 1867, 4,102, chiefly employed in the manufacture of cloths and the preparation of granite building stones. On a neighboring summit is the castle of St. John, which was finished in 1856. Bischofswerda was raised to a city by Benno, bishop of Meissen, in 1076. It has suffered several conflagrations, one of which was by the Hussites in 1429, and another in an engagement between the French and Russians in 1813.

BISCHWEILER, or **Bischwiller,** a town of Alsace, Germany, situated on the Moder, 14 m. N. N. E. of Strasburg; pop. in 1871, 9,231. It was formerly fortified, but was dismantled in 1706. Near Bischweiler is situated the rich iron mine of Mittelhardt. Woollen, linen, oil, soap, and earthenware are manufactured.

BISHOP (Sax. *biscop*, from Gr. *ἐπίσκοπος*, a superintendent), in the Greek, Latin, and Anglican churches, the title given to those who are of the highest order of the priesthood, to the successors of the 12 apostles, in distinction from the priests, who are the successors of the 70 disciples. In the Methodist Episcopal and Moravian churches, and in the Protestant churches of Sweden, Norway, and Denmark, it is the title given to the highest officers in the ministry, who are not, however, regarded as a distinct order. The name was borrowed by the first Christians from the languages of Greece and Rome, in which it designated a civil magistrate. Thus, Cicero was at one time *episcopus oræ Campaniæ*. In the New Testament the words bishop and presbyter, or priest, are sometimes interchanged, as in Acts xx. 17, 28; and St. John, in his last two epistles, adopts the title of priest. Yet, as maintained by Roman Catholic writers, it does not follow because the names priest and bishop were then applied indifferently, that there existed no distinction between the episcopate and the priesthood. "There might have been confusion in the names," says St. Thomas, "but not in the character." Bishops in the Roman Catholic church are regarded as officers appointed by the Holy Spirit to govern the church. The authority which they exercise belongs to their character, and comes from God himself, while the jurisdiction of the priests emanates only from a bishop, and can be exercised only under his direction. At first the bishops were elected by the clergy and people of the diocese, but on account of the tumults inseparable from popular assemblies, various councils, from that of Laodicea in the 4th century to that of the Lateran in 1215, restrained and suppressed the electoral rights of the laity. Charlemagne and other of the northern kings appointed the bishops of their own kingdoms by their own authority. The pope, unwilling that bishops should be dependent upon princes, brought it about that the canons in cathedral churches should have the election of their bishops, which elections were usually confirmed at Rome. At present the mode of choosing bishops varies in different countries. They are elected in some countries by cathedral canons; in others they are nominated by the crown or governments. In all cases the names designated are sent to Rome for confirmation, and the person chosen is appointed to his see by letters apostolic. According to the decrees of the council of Trent, the candidate for this order must be of legitimate birth, 30 years old, well reputed for learning and morality, usually a native of the country in which his bishopric lies, and acceptable to the political government thereof. Within three months from his confirmation he receives the rite of consecration, which is performed in the cathedral of the new bishop, according to the directions of the pontifical, by three bishops appointed for that purpose. The candidate takes the ancient oath of allegiance to the pope and the oath of civil allegiance, subscribes to the confession of faith, receives the insignia of his office, is anointed and solemnly enthroned, and concludes the ceremony with pronouncing the benediction. His insignia are a mitre, the symbol of power; a crosier, in allusion to his shepherd's duties; a finger ring (*annulus pastoralis*), a sign of his marriage with the church; a cross on the breast, distinctive gloves and sandals, and an official robe. The functions of the bishop embrace all the rites and offices of the Christian religion. He administers five sacraments in common with priests, and two others, those of confirmation and ordination, are his peculiar prerogatives. He examines and approves or condemns the works published in his diocese concerning religion, and takes part in the general councils convoked by

the pope for deciding questions of faith. The guardian of discipline, he makes statutes and ordinances which he judges necessary to the maintenance of it, dispenses with canons according to the canons themselves, judges the offences of ecclesiastics, and has power of suspension, excommunication, and absolution. There are Catholic bishops who have no dioceses, and who perform duties within limits assigned by the holy see as vicars apostolic. They bear the title of bishops *in partibus infidelium*, because they are assigned to sees which are in the possession of infidels, and are specially delegated to ecclesiastical duties elsewhere. These are considered successors of the bishops expelled by Mohammedan conquests from their dioceses in the East, and are appointed by the pope as an expression of a perpetual hope and a protest with respect to those conquered sees.—The Protestant movement introduced new conceptions of the church, and changed the form of church government. In the different branches of Protestantism there was substituted for bishops either the presbytery or ecclesiastical autonomy, or the office of bishop was retained with diminished powers. Only in England and the Protestant Episcopal church of the United States has episcopacy been defended by Protestants as a divine institution. Other Protestants affirm its post-apostolic and therefore human origin. The functions of the Anglican bishops are confirmation, ordination of deacons and priests, consecration of other bishops, dedication or consecration of religious edifices and grounds, administration of the effects of deceased persons till some one has proved a right of executorship, institution or collation to vacant churches in their diocese, superintendence of the conduct of the priests in the same, and power of suspension, deprivation, deposition, degradation, and excommunication. Formerly they had also the right of adjudication in questions respecting matrimony and divorce; but in 1857 this episcopal jurisdiction was abolished, and a matrimonial court, consisting of three civil judges, was established. They are peers of the realm and members of the house of lords. Some years ago the revenue of the different sees was reduced more nearly to an equality, the income of the archbishop of Canterbury being fixed at £15,000, that of the archbishop of York at £10,000, those of London, Durham, and Winchester at £8,000 each, and the others at from £5,500 to £4,500. The Anglican bishops are nominated by the crown, and then formally elected by the chapters. The ecclesiastical powers of bishops in the Protestant Episcopal church of America resemble those of the Anglican bishops, but they have no political functions. They are elected by the clerical and lay deputies of the vacant diocese assembled in convention, and before consecration are required to produce certificates before the house of bishops and the house of clerical and lay deputies in general convention. The rights of this office are so restricted in Germany that even Roman Catholic rulers have sometimes been made bishops in the Lutheran church. In Prussia and Nassau this title is ordinarily given to the general superintendents of the Evangelical church. Attempts have been made without success to give this church an episcopal organization.—The bishops of the Greek church are appointed by the archbishops, and must be selected from the monks, and are therefore always unmarried. They have much less authority than the Roman Catholic bishops.—The bishopric is the district or diocese over which a bishop has spiritual jurisdiction. Of the Anglican church, there are in England (1873) 2 archbishops and 26 bishops; in Ireland, 2 archbishops and 10 bishops; in the colonies, 45 bishops; there are, besides these, in union with the church of England 6 missionary bishops, and the bishop of Jerusalem. In the Episcopal church of Scotland there are 8 bishops. The Roman Catholic church in England has 1 archbishop and 14 bishops; in Ireland, 4 archbishops and 25 bishops. In the United States there are 36 bishoprics of the Protestant Episcopal church, and 37 of the Roman Catholic church. There are 10 bishops in the northern division of the Methodist Episcopal church, and 6 in the southern. In 1871 there were in the whole world 660 bishops of the Latin and 63 of Greek and oriental rites. (See ARCHBISHOP.)

BISHOP. I. Sir **Henry Rowley,** an English composer, born in London in 1780, died April 30, 1855. In 1806 he composed the music of a ballet entitled "Tamerlane and Bajazet," which was performed at the Italian opera house, and in 1808 that of "Caractacus," a pantomime ballet, at Drury Lane. At this theatre in the following year was successfully produced his first opera, "The Circassian Bride," but on the following evening (Feb. 24, 1809) the theatre was burned to the ground, and with it the score of the opera. Between that time and 1826 his dramatic engagements of all sorts were numerous, including (to use his own words) "operas, burlettas, melodramas, incidental music to Shakespeare's plays, patchings and adaptations of foreign operas, with glees, ballads, canzonets, and cantatas." During this time he was director of music at Covent Garden theatre, and among over 50 operas which he wrote, the most successful were "Guy Mannering," "The Maniac," "The Miller and his Men," "Maid Marion," "The Slave," "Clari," and "The Englishman in India." In 1826 his "Aladdin" was produced at Drury Lane, but was not successful. He adapted Rossini's "Barber of Seville," Mozart's "Marriage of Figaro," and some other operas, to the English stage. He was director of the concerts of ancient music for several years, also one of the first directors of the philharmonic concerts, and composed some sacred pieces which were performed at different musical festivals. He succeeded Sir John Stevenson as arranger of the music of Moore's "Irish

Melodies." In 1842 he was knighted by Queen Victoria. He had in 1841 been elected professor of music in the university of Edinburgh, but he resigned in 1843, about which time he received the degree of doctor of music from Oxford, and on the death of Dr. Crotch in 1848 was elected to the chair of music in that university, which appointment he held till his death. Toward the close of his life he arranged for the "Illustrated London News" a large number of old English airs, to which Dr. Charles Mackay wrote the words. His style was devoid of affectation, free, flowing, and harmonious. **II. Anna Riviere,** an English vocalist, wife of the preceding, born in London in 1814. She was married in 1831, and her career as a vocalist began in 1837. Her first success was gained as a singer of classical and oratorio music. Later she turned her attention to the opera. Her professional career has been followed in every quarter of the world, and her presence is as familiar in the concert rooms of Australia as in those of England and America. In 1858 she was married to Mr. Schultz of New York, where she resides.

BISHOP STORTFORD, a town of Hertfordshire, England, 32 m. by rail N. E. of London; pop. about 6,000. It derives the first part of its name from having been since the Saxon era the property of the bishops of London, and the second from its situation on the river Stort. It consists chiefly of two lines of streets, and contains a fine parish church, restored in 1820, a capacious market house with a corn exchange, and various educational institutions. A canal connects it with London through the river Lea, and it carries on an extensive trade in malt.

BISMARCK-SCHÖNHAUSEN, Otto Eduard Leopold, prince, a German statesman, born at the manor of Schönhausen, in the district of Magdeburg, April 1, 1815. His father, Karl Wilhelm Ferdinand von Bismarck, was captain in the royal body guard of Prussia, and died in 1845. His mother, who died in 1839, was a daughter of Cabinet Councillor Menken. The Bismarck family has been known for upward of five centuries, during which period several members of it were prominent chiefly as military men under the electors of Brandenburg and the kings of Prussia. Otto von Bismarck was one of six children, the two eldest and the youngest of whom died in infancy. In 1832 he studied jurisprudence and political science at Göttingen. Toward the end of 1833 he entered the university of Berlin, and was admitted to the bar in June, 1835. In 1836–'7 he was referendary at Aix-la-Chapelle and Potsdam. He served his years of military duty partly in the latter city (1837) and partly in Greifswald (1838), where he familiarized himself with the science of husbandry. In 1847 he attended the first united diet at Berlin in his capacity of district delegate of the nobility at the diet of the province of Saxony, and became known as an able and vehement opponent of liberal reforms. In 1848, after the first storm of the revolution, he participated in the gathering of the rural nobility in Berlin, known under the nickname of the *Junker* parliament, and wrote in favor of the feudal party in the newly established *Kreuzzeitung.* In 1849–'50, as a member of the second chamber of the Prussian diet, he urged increased powers for the monarchy, and the consolidation of the German nationality by the joint action of Prussia and Austria. He combated the schemes of union discussed at the Frankfort and Erfurt parliaments, though he was himself a member of the latter, as destructive of the true basis of Prussian power; and in his reactionary zeal even applauded Manteuffel's surrender to Austria at Olmütz. After having been secretary of legation, he was appointed in August, 1851, Prussian ambassador to the Germanic diet at Frankfort. Here he soon manifested a decided turn in his international views, and the pretensions of Austria were repelled by him with so much bitterness that on the eve of the Franco-Italian war of 1859 it was judged prudent to transfer him to St. Petersburg, where he strengthened the friendly relations between Russia and Prussia, and remained till the spring of 1862. He then became Prussian ambassador in Paris for a few months, and in September of the same year succeeded Prince Hohenzollern as prime minister, first provisionally, and on Oct. 8 became the virtual head of the administration and minister of foreign affairs. During the long and exciting conflict between the diet and the government on the subject of the increase and reform of the army, the new premier took strong ground in favor of strengthening the military force, and of the royal prerogative in general. Despite the unfriendly attitude of Austria, he was unceasing in his efforts to effect a joint action with that power in the interest of German unity, and succeeded in procuring her coöperation in the Schleswig-Holstein war (1864), notwithstanding the unwillingness of the Germanic diet. He concluded a new commercial treaty with Austria in 1865. The Gastein convention, Aug. 14, 1865, put an end for a time to the Schleswig-Holstein complications. Bismarck was promoted to the rank of count, Sept. 20, and invested with ministerial authority over the newly conquered territories. The relations with Austria, however, continuing unsatisfactory, Bismarck concluded an alliance with Italy, and war was declared against Austria and her allies at the Frankfort diet (June, 1866). A few weeks' campaign sufficed to crush them, and the treaty of Prague (Aug. 23) extinguished Austria as a German power, dissolved the old German diet, secured Schleswig-Holstein to Prussia, and placed Prussia at the head of a North German confederation. The statesman formerly so unpopular and even hated, on whose life shortly before the outbreak of the war an attempt was made by a young fanatic, was now idolized by the Prussian people. The victories achieved by Bismarck's diplomacy for the

country, and the renown won by the army, put an end to the long parliamentary conflict, and a national endowment was conferred upon him by the chambers. The annexation of Hanover, Hesse-Cassel, Nassau, Frankfort, and Schleswig-Holstein to Prussia, and the establishment of the North German confederation, with the adhesion of Saxony and other states, were considered chiefly due to his ability. He averted war with France on the Luxemburg question by the treaty of London (1867); but the new diplomatic success achieved here by Prussia, in addition to the prestige gained by her previously, increased the jealousy of France, especially as Napoleon's attempt at a coalition with Austria was baffled by Bismarck's secret treaties with the South German states, and by his understanding with Italy. The accession of a Hohenzollern prince to the Roumanian throne being followed in 1870 by a project of raising another prince of that house to the Spanish throne, Napoleon seized this incident as a pretext for a declaration of war, which under Bismarck's influence was met both by the North German confederation and the South German states, with Prussia at their head, with such an unprecedented spirit that France was utterly prostrated in the war, while King William, victorious from the beginning to the end, was proclaimed emperor of Germany at Versailles, Jan. 18, 1871; and he soon afterward promoted Count Bismarck, as the originator of the brilliant triumphs of Germany, to the rank of prince with the title of chancellor of the German empire. Throughout the war Bismarck was by the side of the emperor, displaying at every step new talents for executive and diplomatic affairs. In internal affairs his policy had in the meanwhile gradually assumed a more and more liberal complexion. In 1872 he took strong ground against the doctrine of papal infallibility, caused the expulsion of the Jesuits from Prussia, and insisted upon the subjection of the Roman Catholic church to the civil government. (See Prussia, and Germany.)—Among the many recent works relating to Prince Bismarck are Ludwig Bamberger's *M. de Bismarck* (Paris, 1868; German translation, Berlin, 1868); Dr. Konstantin Rössler's *Graf Bismarck und die deutsche Nation* (Berlin, 1871); and Hesekiel's "Life of Bismarck, Private and Political," translated into English by Kenneth R. H. Mackenzie (1870).

BISMUTH, a metal which shines with such brilliant colors that the name is supposed to be derived from the German *Wiesenmatte*, or meadow lawn. The original word was contracted to *Wissmat*, and finally to *Wismuth*, which is its present German form. The ancients make no mention of bismuth. It is not more than 100 years since a number of the most learned scientific men of Europe stoutly maintained that it could be made artificially, and was not therefore a simple body. After the properties of the metal became well understood search was made everywhere for it, and it was found native in a number of localities—the principal mines being in Saxony, where it is associated with nickel and cobalt to the extent of 7 per cent. Specimens of it have been found in Monroe county, N. Y.; in South Carolina; in Haddam, Conn.; in Virginia; and in several places in South America, especially on the Andes in Bolivia at a height of 15,000 feet. At the mines in Saxony the impure ore is eliquated or subjected to a sweating process, and the drops of the metal, as they ooze out, run down the pipes into iron kettles. In this way the crude ingots are prepared for commerce.—Pure bismuth is a reddish-white metal, closely resembling antimony. It is so brittle that it can be pulverized in a mortar, and yet at certain temperatures it is more or less tenacious, and can be drawn into thin wires. By fusing large quantities of it, say 100 lbs., in a kettle well covered, and then as soon as a thick crust has formed piercing two holes, pouring out the still liquid contents, and sawing off the upper crust, there will be disclosed magnificent crystals with cubical facets, and in clusters, resembling a ruined city. These crystals have all the iridescence and play of colors of the rainbow. The specific gravity of the metal is 9·83, and it melts at 264 C. (507° F.). This point of fusion is used to adjust high-ranged thermometers. An alloy of antimony and bismuth, arranged in a great number of small prisms, affords the most sensitive thermometer that has been constructed. We can measure the $\frac{1}{10,000}$ of a degree by this delicate instrument, and by it even the moon can be shown to afford some heat. The principle upon which it is based is the action of heat to produce an electric current which moves a carefully adjusted magnetic needle. The passage of the hand before the instrument, or the faintest breath, or any radiating surface turned toward it, immediately excites the electric current, and causes the needle to move around the graduated arc; and in this way the slightest change in temperature can be measured. Some celebrated experiments were performed with it by the Italian philosopher Melloni, and also by Dr. John W. Draper of New York, for the purpose of deciding many nice points in reference to the transmission, radiation, and refraction of heat. Melted bismuth expands on cooling, following the same law as iron and water on its conversion into ice. Bismuth imparts brittleness to other metals, rendering even gold and silver less malleable, and forming, it is said, a crystalline alloy with iron. The alchemists looked upon it as a bastard metal, and sometimes called it lead ashes, *plumbum cinereum*, on account of its close resemblance to antimony. They also spoke of it as *antimonium femininium*, or the female antimony. Its frequent occurrence in beautiful dendritic groups also suggested to the early miners that it could be cultivated the same as any tree or vegetable.—Bismuth has the property of imparting fusibility to other metals;

hence one of its chief uses is to prepare alloys that will melt at very low temperatures. A mixture of two parts of bismuth, one of lead, and one of tin, will melt at 200° F.; and spoons are often cast of this alloy, to be used as toys, melting away instantly in any hot liquid. One part of bismuth, two of tin, and one of lead form a soft solder for pewterers. It is also employed as a bath for tempering steel, and as a cake mould for toilet soap. Another alloy, composed of 5 parts of bismuth, 3 of lead, and 2 of tin, melts at 199° F., and is known as stereotype metal. An amalgam of 20 parts of bismuth and 80 parts of mercury is extensively used for silvering the interior of glass globes, and for similar ornamental purposes. Dr. Wood of Nashville, Tenn., discovered an alloy still more fusible than any of those above mentioned. It is composed of 8 parts of bismuth, 4 of lead, 2 of tin, and 2 of cadmium, and is said to melt at 158° F. One of the earliest compounds of bismuth that received any attention, the preparation of which was for a long time kept a profound secret, is the subnitrate, now known under the name of pearl-white. This salt is extensively used for enamels on porcelain, and also in gilding. It has great solvent properties with other oxides, especially with silica and borax; and as it imparts no color, it is valuable in the manufacture of porcelain and of optical glass. The nitrate, mixed with a solution of tin and tartar, has long been employed as a mordant for dyeing lilac and violet in calico printing. Pearl-white is principally used as a cosmetic to give a brilliant tint to faded complexions. Sulphur converts the salts of bismuth into the black sulphide of bismuth, so that the smallest trace of sulphur in the illuminating gas may gradually turn the pearl-white to a dark hue. If we write with a pen dipped in a solution of the nitrate of bismuth, after it is dry nothing can be seen; but on plunging the paper into water the writing will become distinctly visible.—Mr. Farmer of Boston has invented an ingenious thermo-electric battery, composed of a row of bars of an alloy of antimony and bismuth, which only require to be heated to excite a powerful galvanic current. The simplicity of the arrangement, the avoidance of acid fumes, the constant readiness for use, and the facility with which it can be set in action, commend this form of apparatus to the attention of physicists. It is evident that if by simply heating one end of a metallic bar a sufficiently powerful current can be excited to produce all the effects of an ordinary galvanic battery, this would afford the most convenient and economical arrangement for the telegraph, for electro-plating, and in fact for all the purposes to which the old form of battery is now applied.—The spectrum of bismuth presents a multitude of brilliant rays in the green, a faint and one strong ray in the red, and a feeble one in the orange.—According to Wagner, the production of bismuth in Saxony in 1871 was 32,000 lbs.—The subnitrate of bismuth is used medicinally in painful affections of the stomach, such as cancer, cardialgia, chronic ulcer, and chronic inflammation. Its action seems to be a local one, little or none of the drug being absorbed. It may be considered either as astringent or more probably as simply protecting irritable surfaces mechanically. It has also been used with advantage in chronic diarrhœas. It has been applied externally in eczema and allied conditions of the skin and mucous membranes. The carbonate may be employed in the same way as the subnitrate, and in the same doses. From 5 to 15 grains may be given three times a day. Some practitioners have given two or three drams at once, but such doses are not to be recommended.

BISON, a name given to three species of the ox family. 1. The European or Eur-Asiatic species, *bos urus*, known as the *bonassus*, is supposed to be the ancient *urus* or *aurochs*. (See Aurochs.) 2. The Indian bison (*B. gaunis*) is but partially known and imperfectly described. It has the general characteristics of the bisons, the short horns, huge head, unshapely forehead, and the vast masses of shaggy wool covering those parts. It frequents the Ghauts and the wildest forest ranges of the Himalaya. 3. The bison, commonly and erroneously called buffalo, of North America (*B. Americanus*), is distinguished by its singular hump over the shoulders; this hump is of an oblong form, diminishing in height

Bison Americanus.

as it recedes, so as to give considerable obliquity to the line of the back. The eye is black and brilliant; the horns are black, and very thick near the head, whence they curve upward and outward, tapering rapidly toward the point. The outline of the face is convexly curved, and the upper lip on each side, being papillous within, dilates and extends downward, giving a very oblique appearance to the lateral gap of the mouth, in this particular resembling the ancient architectural bass reliefs representing the heads of oxen. The physiogomy of the bison is menacing and ferocious; but this appearance is a mere outward show, since of all the

species the bison is the most pacific. Even in his breeding season the bison will not attack man. In summer, from the shoulders backward, it is covered with a very short fine hair. The tail is short, and tufted at the end. The color of the hair is uniformly dun, but the long hair on the anterior parts of the body is to a certain extent tinged with yellowish or rust color. The shaggy masses of hair which cover the head, shoulders, and neck of the male, with his great beard, are of a darker shade of the same hue. The sexual season of the bison commences in July, toward the latter end of the month, and lasts till the beginning of September; after which time the cows leave the company of the bulls and range in different herds. They calve in April, and the calves never leave the mother until they are a year old, while they often follow her until they are three years old. From July to the end of December the cows are very fat and in prime condition; the bulls are always poor, and their flesh is lean and hard; during the breeding season it is rank and disagreeable. At this time of the year the roaring of the bulls on the prairies is like hoarse thunder, and they fight furious battles among themselves. When migrating, they travel in vast solid columns of thousands and tens of thousands, which it is almost impossible to turn or arrest in their progress, since the rearward masses drive the leaders on, whether they will or no. The flesh of the bison, the cow especially, is like coarse-grained beef, but is juicy, tender, and sapid in the highest degree. The favorite portion is the hump, which, when cooked in the Indian fashion, by sewing it up in the hide, singed and denuded of hair, and baking it in an earth oven, wherein a fire has been previously kindled, and over which a second fire is kept burning during the process, is considered the most exquisite of dainties; the tongue and the marrow bones are also greatly prized. Numerous tribes of Indians are almost entirely dependent on the bison for their food, clothing, dwellings, and even fuel; the dressed hides with the hair on form their robes—denuded of it, the covers of their tents; and the dried ordure—known on the prairies as *bois de vache*—on the vast treeless plains of the west, furnishes the sole material for their fires. The dressed hides are a considerable article of commerce, and for these as well as for other causes the slaughter of these animals is prodigious. Their original range appears to have been the whole of the North American continent, west of Lake Champlain and the Hudson river, with the exception of some intervals on the Atlantic seaboard, and south of the Ottawa and Columbia rivers, northward of which its place is supplied by the musk ox, as is that of the elk and moose by the reindeer. For many years they have ceased to exist to the eastward of the Mississippi.

BISSAGOS, a group of islands situated near the mouth of the Rio Grande, in western Africa, between lat. 10° and 12° N. and lon. 15° and 17° W. Only 16 of them are of any magnitude. Bissão, the most important, contains a Portuguese settlement, and was the centre of the Portuguese slave trade; pop. 8,000.

BISSELL, William H., governor of Illinois, born near Cooperstown, N. Y., April 25, 1811, died in Springfield, Ill., March 18, 1860. He took the degree of M. D. at the Jefferson medical college, Philadelphia, in 1835, practised medicine two years at Painted Post, N. Y., removed to Monroe county, Ill., in 1837, was elected to the state legislature in 1840, and there earned distinction as a forcible and ready debater. He subsequently studied and practised law, and was elected prosecuting attorney of St. Clair county in 1844. He served in the Mexican war in 1846 as colonel of the 2d Illinois volunteers, and distinguished himself at Buena Vista. On his return home in 1849 he was elected without opposition a representative in congress, in which capacity he served till 1855, resisting the repeal of the Missouri compromise, though he had previously acted with the democratic party, and gaining much reputation in the North by his defiant bearing in a controversy with Jefferson Davis respecting the comparative bravery of northern and southern soldiers. Davis challenged him, and he accepted the challenge, selecting muskets as the weapons to be used, at so short a distance as to make the duel probably fatal to both parties. Finally the quarrel was compromised and the challenge withdrawn. In 1856 he was elected governor of Illinois by the republicans, and died before the expiration of his term.

BISSET, Robert, an English writer, born in 1759, died May 14, 1805. He was a graduate of the university of Edinburgh, and is known as a continuator of the histories of Hume and Smollett, which he brought down to the end of the reign of George III. He published an essay on democracy and a life of Edmund Burke (1786), a romance called "Douglas," and an edition of the "Spectator," with lives of the various contributors and valuable notes.

BISTRE, a reddish brown water color, generally obtained from the soot that collects in chimney flues. This is pulverized and washed to remove the saline ingredients. The finest sediment is then dissolved in vinegar, to which gum water is afterward added. It was formerly much used for making painters' crayons, and also for a paint in water-color designs. Sepia, however, is now preferred to it.

BISTRITZ (Hun. *Beszterczе*), a free royal town of N. E. Transylvania, on a river of the same name, capital of the Saxon circle of Bistritz or Nösnerland; pop. in 1870, 7,212. It has three gates of entrance, and two suburbs chiefly tenanted by Wallachs. Among the public buildings are a handsome city hall and a Gothic Protestant church, the steeple of which is 250 ft. high. Wine, potash, and cattle selling are the chief sources of wealth. Near it are the remains of a castle once the residence of the Hunyadys.

BITHOOR, or **Bittoor,** a town of Hindostan, province of Allahabad, on the Ganges, 21 m. N. W. of Cawnpore; pop. about 9,000. As a religious city it enjoys high repute, and every year in November and December is the scene of a festival. Besides a number of Hindoo temples, it has magnificent ghauts, or flights of steps, on the brink of the sacred river, where the priests and worshippers of Brahma perform their prescribed ablutions. One of these ghauts is held to have been honored by the presence of Brahma himself, who there sacrificed a horse after creating the universe. A pin fixed in one of the steps, and believed to have dropped from the god's slipper on that occasion, is an object of deep veneration. For a long period this town was the residence of the chiefs of the Mahrattas, the last of whom died without issue in 1851. His estate then reverted to the East India company, to the exclusion of the claim of an adopted son, Dhundoo Punt, who was, however, permitted to occupy the town, and is known by his title of the Nena Sahib. He became the leader of the sepoy mutineers in 1857–'8. In July, 1857, Gen. Havelock drove the Nena from the town and dismantled it; it was subsequently reoccupied by the mutineers, and after a well fought battle again taken by Havelock, Aug. 16.

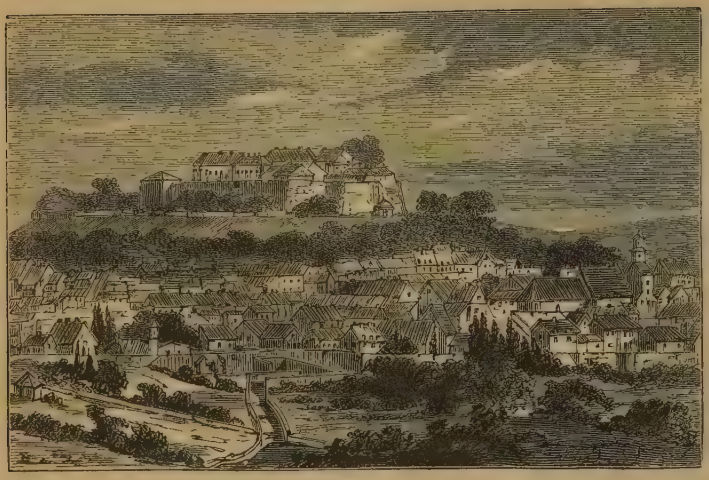
Ghaut on the Ganges.

BITHYNIA, an ancient country of Asia Minor, bounded N. by the Euxine, E. by Paphlagonia, S. by Phrygia and Galatia, and W. by the Propontis and Mysia, and comprising the N. E. portions of the Turkish eyalet of Khodavendigiar. According to Herodotus, the Bithyni came from the banks of the Strymon in Thrace, having been expelled thence by a more powerful horde; and Thucydides and Xenophon corroborate this statement by calling their descendants Bithynian Thracians. The Bithynians maintained their independence till they were subdued by Crœsus, king of Lydia. On the overthrow of the Lydian monarchy they passed under the power of the Persians, and their country became a part of the satrapy of Phrygia. In later times, however, it was itself constituted into a satrapy, and even a native dynasty sprang up in it. After the defeat of the Persians on the Granicus, Bithynia fell under the sway of the Macedonians. On the death of Alexander the Great, Bas, the son of Botiras, a native chief, vanquished Calantus, the Macedonian governor, and took possession of Bithynia for himself and his posterity. Nicomedes, the fourth in descent from Botiras, was the first of this dynasty who assumed the title of king. The kingdom of Bithynia endured for over two centuries. Its last king was Nicomedes III., who, having no children, bequeathed his dominions to the Romans, 74 B. C. The Romans annexed Bithynia first to the province of Asia, and then to that of Pontus. In the reign of Augustus it was separated from the latter, and, together with the western part of Paphlagonia, constituted a proconsular province. The inland districts of Bithynia were mountainous and woody, embracing the Bithynian Olympus; but the country near the coast consisted for the most part of fertile plains, which were studded with villages. Its chief river was the Sangarius (now Sakaria), which traversed it from south to north. Among its towns were Nicomedia and Prusa (Brusa), successively capitals, Heraclea, Chalcedon, and Nicæa.

BITON AND CLEOBIS, in Greek legend, sons of Cydippe, priestess of Juno at Argos. On one occasion, the oxen which dragged the chariot of the priestess not being at hand, they drew their mother to the temple, a distance of about five miles. Cydippe prayed to Juno to grant to them in reward what was best for mortals. That night the brothers slept in the temple, and never awoke. This was the greatest boon the goddess could grant.

BITONTO (anc. *Butuntum*), a town of S. Italy, in the province and 10 m. W. of Bari; pop. in 1872, 24,978. It is handsomely built, and has a fine cathedral and a large orphan asylum. A victory was gained here by the Spaniards over the Austrians, May 25, 1734, which gave the former possession of the kingdom of Naples. The ancient Butuntum is only known from coins.

BITSCH (Fr. *Bitche*), a town and fortress of Alsace-Lorraine, formerly belonging to the French department of Moselle, 35 m. N. W. of Strasburg; pop. in 1866, 2,740. The fort is on an isolated rock, defending one of the main roads through the Vosges, with bomb-proof casemates hewn from the solid rock, and is well supplied with water. Before the late Franco-German war it contained 90 guns. It was invested by the German forces in August, 1870, and in September suffered a severe bombardment. It however held out until the preliminaries of peace were signed, when together with the territory in which it is situated it was ceded to the Germans. The town contains

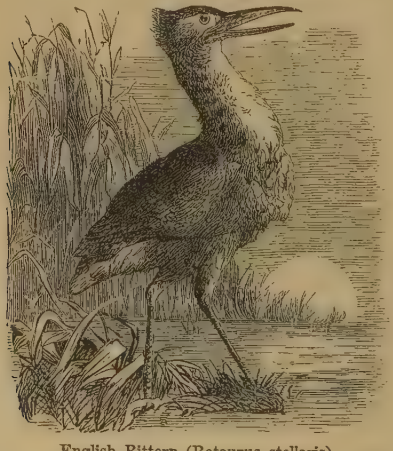


Bitsch.

manufactories of paper and porcelain, and in the vicinity are extensive glass works.

BITTERFELD, a town of Prussian Saxony, in the district of Merseburg, at the junction of the Mulde with the Lober, 17 m. by railway N. of Leipsic; pop. in 1871, 5,043. It is pleasantly situated, and contains waterworks. Railway communication with all parts of the continent has produced within the last few years great industrial activity. There are coal mines and several iron founderies, breweries, and distilleries, and cloth, pottery, machinery, and other articles are manufactured here. The town was founded in the middle of the 12th century by Flemings.

BITTERN, a fen fowl, of the order *grallatores* or waders, family *ardeidæ*, which also includes the herons, old genus *ardea* (Linn.). There are in Europe several species of this bird, which



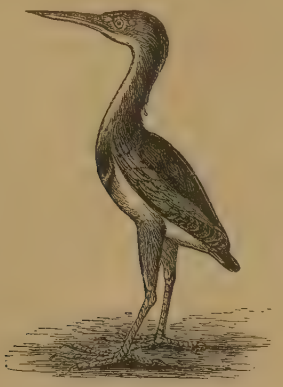
English Bittern (Botaurus stellaris).

resembles the heron. The most common, the English bittern (*botaurus stellaris*, Steph.), is famous for the peculiar nocturnal booming sound which it emits in the deep watery morasses of which it is an inhabitant, to which sound it owes several of its names, as the bog-bumper, mire-drum, &c. In the United States there are three species: *A. minor* or *botaurus lentiginosus* (Steph.), corresponding to the European bittern, 26½ inches long, and of a brownish yellow color; the green bittern or green heron (*A.* [*butorides*] *virescens*), 15 inches long, very common in inland streams and mill ponds, a beautiful bird, but commonly known by a vulgar and indelicate nickname; and the least bittern (*ardetta exilis*), an extremely small and beautifully marked bird. All the bitterns are handsome birds, with long necks, which they hold proudly erect; fine, pendulous, but erectile crests; a long fringe of feathers on the neck, mottled with yellow, brown, and black, like tortoise shell; and all their upper

Green Bittern or Green Heron (Butorides virescens).

parts variegated with black, brown, rust color, yellow, and white, like those of the woodcock. Their long legs are bare far above the knee, to enable them to wade into deep water, in pursuit of their fishy and reptile prey. They have clear, penetrating eyes, with a fearless look, which well expresses their bold and self-reliant character. If wounded or broken-winged, they will fight bravely with their sharp-pointed bills, striking at the eyes either of men or dogs, to the latter of which they are formidable antagonists. Their voice

is a harsh *qua-ak;* their flight slow and heavy, with their long legs outstretched behind. Their habits are nocturnal; their haunts



Small Bittern (Ardetta exilis).

fresh-water pools, stagnant rivers, and morasses; they build, like the heron, in trees, ordinarily raising two young ones. Their food is small fish, lizards, frogs, and frog spawn, of which they are voracious consumers. They are good eating in September, when the first frosts are commencing, and are eaten roasted, with currant jelly and stuffing, like the hare, which they somewhat resemble.

BITTER PRINCIPLES, substances extracted from plants by digestion in water, alcohol, or ether, and which possess in concentrated form that which gives the bitter taste to plants. Excepting this, these extracts do not appear to possess other characteristic properties in common; their nature, however, is not very well understood. Many alkaloids, especially quinia and strychnia, possess an intense bitterness, but are not classified with the substances just described, because they possess other much more important properties. Some bitter principles are crystallizable, as colombine, quassine, gentiopicrine, taraxacine, aloine, and phloridzine, a substance obtained from the bark of the apple, pear, and cherry; while the bitters of hops, pinkroot, and wild cherry have not yet been obtained in crystals, and that of the last mentioned drug not even isolated. Some of the numerous varieties of bitters are soluble in water; some only in alcohol or ether. They are generally neutral in their properties, uniting neither with acids nor bases.—Bitters are used in medicine as tonics, and also as aperients; and in the manufacture of malt liquors they are employed to impart to them their bitter flavor. In the healthy condition bitters do not assist or accelerate digestion, but rather the contrary, as has been shown by direct experiment. When the digestion is enfeebled, however, they seem to impart vigor to this process by stimulating the flow of gastric juice and by retarding the progress of abnormal fermentations, which have a tendency to take the place of and interrupt the healthy process. The sensation produced by the irritation of bitters in the stomach should not be mistaken for true hunger.

BITTOOR. See Bithoor.

BITUMEN, a generic name for a variety of substances found in the earth, or exuding from it upon the surface, in the form of springs. The liquid varieties become inspissated by exposure, and eventually harden into the solid form, which is asphaltum. The bitumens burn with a flame and thick black smoke, giving out the peculiar odor called bituminous. Some of the impure fluid bitumens, and the solid variety when melted, closely resemble coal tar. They are distinguished from bituminous coal in giving no ammonia, or mere traces of it, by distillation, and in developing negative electricity by friction without being insulated; also, when ignited upon a grate, the bitumens melt and run through at the temperature of about 220° F., but the coals burn to ashes. In melting, volatile fluids escape from them with no swelling up other than that due to ebullition. This property of dividing by heat into fluids and solid residues having a porous form, assimilates the bitumens to ordinary turpentine and tar, and renders them unsuitable for producing gas economically. In boiling water the bitumens soften, adhere to the sides of the vessel, and give off naphtha; coal undergoes no change. The bitumens, again, dissolve perfectly in spirits of turpentine, benzole, rosin oil, linseed oil, and sulphuric ether; while coal, after long digestion in the oils, only colors the liquid brown, and to the sulphuric ether imparts a naphtha-like fluid and a resinous body. The bitumens decompose nitric acid, coal does not; they combine with sulphuric acid, coal is not affected by it. Dropped upon melted tin with a temperature of 442° F., the bitumens decompose and give off copious fumes; coal is unaltered. Most of these points of difference were given in evidence by Dr. A. A. Hayes and Dr. C. T. Jackson of Boston, in an important suit tried in New Brunswick, to test the title to the Albert coal-mining property, this turning on the point whether the product was coal or asphaltum. Dr. Ure notices that the fluid bitumens differ from coal tar in not producing the six substances extracted from the latter by Mr. Mansfield, and named by him alliole, benzole, toluole, camphole, mortuole, and nitro-benzole.—The varieties of bitumen commonly described are: the liquid oil, naphtha, or, in its more impure form, petroleum; the viscid pitchy bitumen, which passes into the black resinous asphaltum; and the elastic bitumen, or elaterite of the mineralogists. The last is also called mineral caoutchouc, from its property of rubbing out pencil marks. It was first found in the deserted lead mine of Odin, in Derbyshire, England, by Dr. Lister, in 1673, and was called by him a subterranean fungus. It occurs in soft flexible masses of blackish brown colors and resinous lustre, and consists

of about 85 per cent. of carbon, and the remainder hydrogen with probably some oxygen. Compact bitumen, or asphaltum, has been noticed under ASPHALTUM; but further consideration will be given to it in this article in treating of the uses of the bitumens. Grahamite, found in West Virginia, and albertite, in Nova Scotia, are supposed to be inspissated and oxygenated petroleums. Chapapote is an asphaltum found in abundance near Havana, and elsewhere in the island of Cuba. It appears to be a consolidated petroleum, a liquid variety of which is often seen near it oozing through the fissures of the limestone rocks. The solid product is of jet-black color, and gives a brown powder and a strong but not unpleasant odor. Its specific gravity is given by Dr. Hayes at from 1·165 to 1·170. It melts in boiling water into a thick liquor, and forms a scum upon the surface. Alone, it melts at 214° F. into a uniform fluid, which may be poured from one vessel to another; calcined in close vessels, it swells and leaves a very light coke; dissolved in spirits of turpentine, it makes a coarse varnish. Brown-colored and viscid oils are extracted from it. Petroleum and naphtha are fluid substances, called also rock oil, which flow up through fissures in the rocks, and collect in low places, and are found floating upon the surface of the waters of lakes. When indurated and oxidized by exposure, they are asphaltum. The purer form, called naphtha, is very common in many parts of the world, and in numerous places is turned to good account as a fuel, and also for illumination. (See NAPHTHA, and PETROLEUM.) These different varieties of bitumen are found only in the secondary and tertiary formations. If they occur at all in the primary rocks, it is merely in veins and fissures, which probably have been filled long after their formation. They are very generally met with in connection with salt springs, or mines of rock salt. Near volcanoes, petroleum is often seen issuing with the waters of springs, or floating upon the sea, furnished from springs at its bottom. The ancient Babylonians obtained the imperishable cement for their structures from the fountains of Is, which is the modern Hit, on the right bank of the Euphrates. These still continue to pour out inexhaustible supplies, mingled with the strongly saline and sulphurous waters. Common salt is also prepared here from the brine springs. The water of the springs has a temperature of about 160° F. As it flows slowly along a conduit, the oily bitumen gathers on the surface, and is skimmed off and laid in pits exposed to the air, in which it speedily hardens into flakes of about an inch thick, which are sold at Hit for about five cents the cwt. It is much used for covering the houses and boats of the region. The rock formation is an argillaceous limestone, over which is found in some places a coarsely granular gypsum. These fountains are celebrated as having attracted the attention of Alexander the Great, Trajan, and Julian. The bituminous products of the Dead sea in Palestine are collected on the E. and W. sides of the lake, and are supposed to be derived from a bed of bitumen at the bottom. The pieces resemble pitch, and, though one seventh heavier than pure water, float upon the saline water of the Dead sea, the specific gravity of which is 1·23. They melt in boiling water, and when distilled yield a volatile oil, some water, and traces of ammonia. The residue consists of charcoal, amounting to one eighth of the weight of the asphaltum, its ashes composed of silica, alumina, oxide of iron, and traces of lime and manganese. It is from this locality that the name Jews' pitch has been given to asphaltum. In the island of Trinidad, in the West Indies, there is a famous lake of asphaltum and petroleum called Tar lake, or by the French Le Brai, from its material answering the purposes of pitch, and possessing this additional advantage, that it keeps off the teredo or borer, which in warm climates is so destructive to the timber of ships. The lake is near the sea, about 3 m. in circumference. It appears at a distance like water, but near by like a lake of glass. In approaching, a strong sulphurous smell is perceived at the distance of 8 or 10 miles. When the weather is hot and dry, the surface of the lake is so soft and sticky one cannot walk upon it. A foot below the surface it becomes softer, and contains an oily substance in little cells. Specimens of this bitumen, which were regarded as pure, and taken to Europe, were examined by Mr. Hatchett, who found them to consist of a porous and argillaceous stone thoroughly impregnated with bitumen. It does not burn readily, but becomes plastic by a slight increase of temperature. Bitumen is also found disseminated through calcareous and sandstone rocks, and saturating slates and shales. Nearly all the varieties of it are liable to have many impurities mixed with them, and all contain volatile oils and water.—The bitumens are purified by first boiling them with water. The sand and other mineral substances fall to the bottom, and the bitumen floating or sticking to the sides of the boiler is skimmed off and put into another boiler, by which more water is separated. It is then boiled by itself for some time, and is entirely freed from water and oils and the solid impurities, which subside to the bottom. It is thus obtained in the form of a thick fatty pitch, ready to be barrelled for the market or applied to its uses.—The results of the ultimate analysis of the pure natural bitumens, whether liquid or solid, vary but little from 88 per cent. of carbon and 12 of hydrogen. A solid bitumen of Coxitambo, near Cuenca in Ecuador, gave 88·7 per cent. of carbon and 9·7 of hydrogen, with 1·6 of oxygen and nitrogen. Nitrogen is usually present to the extent of a trace, and in the solid asphaltum it has been found to the extent of 12 per cent., and oxygen also in the same variety about 8 per cent. By treating asphaltum with different solvents, three dis-

tinct bodies may be separated. Water dissolves nothing. Anhydrous alcohol dissolves a yellow resin equal to $\frac{1}{20}$ of the weight of the asphaltum; this is soluble also in ether. The residue, insoluble in alcohol, treated with ether, yields a dark brown resin, which is separated by evaporating the ether. It amounts to $\frac{7}{10}$ the weight of the asphaltum. It dissolves easily in volatile oils, and in oil of petroleum. The latter also, as well as turpentine oil, takes up the residue which the ether leaves.—The following formulas, exhibiting the composition of petroleum and asphalt, are given by Dr. Muspratt, as setting forth in a striking manner the derivation of the latter by oxidation of the former:

Naphtha, or petroleum.....$C_{20}H_{16}$, or $C_{40}H_{32}$
Asphalt, or bitumen.....$C_{40}H_{32}O_6$

—Great expectations have been entertained of the important uses to which the natural bitumens might be applied; they have proved to be admirably adapted for the construction of walks, terraces, roofs, and every kind of hydraulic work. The material most successfully employed in France for producing the bituminous mastic is liquid bitumen mixed with a bituminous limestone, which is ground to powder, sifted and stirred into the boiling asphaltum, four parts of the stone to one of the bitumen. Dry, common limestone, or broken bricks, will answer as well. The mixture, when of homogeneous consistency, is poured out upon a table covered with sheets of paper, and upon which a square frame is placed for receiving the sheets of mastic. It is spread smoothly by a heated iron roller, sprinkled with sand, and left to cool. When laid, they are united by soldering with a hot iron. Coal tar is often substituted for the natural bitumen, but it is considered far inferior to it in durability and strength. The bituminous limestone is found at Val de Travers, in the canton of Neufchâtel, in the Jura limestone formation, corresponding to the English oölite. It consists of 80 per cent. carbonate of lime and 20 per cent. of bitumen. It is tough, difficult to break with a hammer, and is excavated by blasting. Slightly heated, it exhales a fragrant odor, quite different from that of the factitious compounds. The carbonate of lime is so protected by the bitumen that it does not effervesce with muriatic acid. In any artificial mixture it would be impossible to produce so intimate a combination of these substances as is found in this natural asphalt rock. Silicious matters, as sand and smooth pebbles, are not so well adapted for the preparation of durable mastic as calcareous substances, because they have little attraction for the bitumen, and the mixture is liable to crack and crumble. Bitumen is applied also in the form of an external coating of mastic to give strength and protection to thin sheet-iron pipes and glass tubes used for conveying water, also for roofing. To some extent asphaltum may be used as a fuel, especially for heating meters in gas works, when blown into the grate in the form of powder. It appears to have been a principal ingredient in the destructive Greek fire. (See GREEK FIRE.) Bricks of poor quality saturated with it are rendered strong and impervious to water. It answers most of the purposes for which coal tar is used. It makes the strongest cement for laying brick and stone work. The ancient Egyptians used some form of it for embalming bodies. The hardness of the mummies is probably owing to the combination of bitumen with the animal substances. In France a process has been patented for spreading fluid bitumen upon canvas sheets or netting and passing it between metallic rolls, thus coating the cloth on one or both sides, and to any desired thickness. The use of the material is for lining buildings.—The origin of the bitumens has been regarded as very doubtful. The composition would seem to refer them to vegetable matters, though they possess very marked differences from the coals.

BITUMINOUS SHALE, a soft variety of argillaceous slate, found usually associated with coal. It contains a variable proportion of bitumen, sometimes so much of it that it will burn. In Mansfeld, Germany, the bituminous schist found immediately over the new red sandstone contains also a small quantity of copper pyrites, and though it yields only 1½ per cent. of metal, it is made to pay a profit by the ore furnishing its own fuel for reduction. Shale is sometimes distilled for paraffine and illuminating oil.

BITZIUS, Albert, a Swiss author, better known under the pseudonyme of Jeremias Gotthelf, born at Morat, in the canton of Fribourg, Oct. 4, 1797, died at Lützelflüh, in the Emmen valley of the canton of Bern, Oct. 22, 1854. In early life he officiated as pastor in Bern, and for some time took part in politics; but from 1837 till his death he devoted himself exclusively to literature. His writings consist chiefly of tales descriptive of the home life of Switzerland. A complete edition of his works in 24 vols. was published at Berlin, 1855–'8. He also published several popular almanacs.

BIZERTA, or **Benzerta** (anc. *Hippo Zarytus*), a fortified seaport town on the N. coast of Tunis, the northernmost town of Africa, on a gulf which communicates with a lake in the interior; pop. about 8,000. The harbor was formerly commodious, but is now choked up with sand, and receives only small vessels. The adjoining lake abounds in fish, the roes of which, dried and formed into a substance called *botargo*, are an article of Mediterranean commerce.

BJORLING, Carl Olaf, a Swedish prelate and author, born at Westerås, Oct. 17, 1804. He is a graduate of Upsal, and became a teacher of mathematics and afterward of history. He was ordained in 1844, was promoted to the deanery of Westerås in 1852, and in 1866 he was consecrated bishop of that diocese. The principal of his various learned works (in La-

tin) is *Dogmata Religionis Christianæ ad Formulam Doctrinæ*, &c. (2 parts, 1847–'69; 2d edition of the first part, 1866).

BJÖRNEBORG, a seaport town of Finland, in the province of Abo-Björneborg, near the mouth of the Kumo, 72 m. N. N. W. of Abo; pop. 7,270. The old town was wholly burned down in 1801; the new town is well and regularly built. It exports pitch, tar, pine, oil, and wooden ware.

BJÖRNSON, Björnstjerne, a Norwegian author, born at Kvikne, Österdalen, Dec. 8, 1832. He is the son of a clergyman, studied at the university of Christiania in 1852, and early connected himself with the press, his contributions attracting much attention. For two years he was manager of a theatre at Bergen, and next he edited a political journal in Christiania, encountering much opposition, which drove him from Norway, and he resided for a number of years mainly in Copenhagen, returning to Christiania in 1862. He has acquired a wide reputation by his novels and tales, descriptive of Norwegian popular life, and by his dramas and poetry. Many of his works have been translated into English, German, and other languages. Among those best known by translations in the United States and in England are "Arne" (London, 1866); "The Fisher Maiden," translated from the author's German edition by M. E. Niles (New York, 1869; translated in England under the title of "The Fishing Girl," London, 1870, from the Norwegian edition); "The Newly Married Couple," and "Love and Life in Norway" (London, 1870).

BJÖRNSTJERNA, Magnus Fredrik Ferdinand, count, a Swedish statesman and author, born in Dresden, Oct. 10, 1779, died in Stockholm, Oct. 6, 1847. He went to Sweden in 1793, entered the army, served in the war in Finland, and in Germany at the battles of Dessau and Leipsic, negotiated the capitulation of Lübeck with Gen. Lallemand, and, after taking an active part in the military operations in Holstein and Norway, concluded the convention which established the union of Sweden and Norway. In October, 1812, he negotiated at London the sale of Guadeloupe. He wrote a work on the theogony, philosophy, and cosmogony of the Hindoos, and another on the British rule in India.

BLACAS, Pierre Louis Jean Casimir, duke de, a French statesman, born at Aulps, Jan. 12, 1771, died at Görz, Nov. 17, 1839. At the commencement of the revolution he emigrated, but returned to France with Louis XVIII., entered his cabinet, and became one of the intimate advisers of the Bourbons. Sent to Rome as ambassador, Blacas negotiated the concordat of 1817. He was afterward ambassador at Naples. On the fall of the Bourbons in 1830 Blacas returned to exile and offered Charles X. his fortune, which the dethroned king would not accept.

BLACK, Adam, a Scottish publisher, born in Edinburgh in 1784. In conjunction with his brother Charles he established a publishing firm in Edinburgh, well known in connection with Sir Walter Scott's works, the "Edinburgh Review," and the "Encyclopædia Britannica," to the 8th edition of which Mr. Black contributed several articles. He avowed liberal opinions at a time when they were unfashionable, and joined warmly in the movement to secure parliamentary and municipal reform. He was elected twice to the office of lord provost of Edinburgh, which he occupied from 1843 to 1848. During a visit to England, while holding that position, he declined the honor of knighthood. In February, 1856, on the final retirement of Mr. Macaulay from the representation of Edinburgh, Mr. Black was unanimously chosen to succeed him, and held the seat till 1865. He advocated parliamentary reform and the ballot.

BLACK, Jeremiah S., an American lawyer, born in the Glades, Somerset co., Penn., Jan. 10, 1810. He was admitted to the bar in 1830, appointed president judge of the judicial district in which he resided in April, 1842, elected judge of the supreme court of the state in 1851, and chosen chief justice. He was reëlected in 1854. On March 5, 1857, he was appointed by President Buchanan attorney general of the United States, which office he held till December, 1860, when he became secretary of state, and continued in that position during the remainder of President Buchanan's term. Since retiring from office he has been engaged in the practice of his profession.

BLACK, Joseph, a Scottish chemist, born in Bordeaux, France, in 1728, died in Edinburgh, Nov. 26, 1799. He was educated at Belfast, Glasgow, and Edinburgh, studied medicine, was a pupil and assistant of Dr. Cullen, and became distinguished by his experiments upon lime. It was supposed that quicklime held in absorption something of an igneous character; but Black discovered that the causticity of the calcareous earths is not derived from any combination, but is their peculiar property, and that they lose this property when they combine with a certain portion of air, to which he gave the name of fixed air, but which is now known as carbonic acid gas. Dr. Black was invited in 1756 to succeed Dr. Cullen at Glasgow, and there made his most important discovery. Ice, he observed, being converted into water, absorbs a large amount of heat, the existence of which is no longer indicated by the thermometer. Water being converted into vapor absorbs another large amount of heat, which is in like manner lost to the senses or the thermometer. Dr. Black, observing these phenomena, said that the heat is concealed (*latet*) in the water and vapor, and introduced the name and the theory of latent heat. This discovery suggested to Watt, who was a pupil of Black, his improvements in the steam engine. In 1766 Dr. Black was appointed to the chemical chair of the university of Edinburgh, where his lectures were very suc-

cessful. His only publications were three dissertations, giving an account of his experiments on magnesia, quicklime, and other alkaline substances; his observations on the more ready freezing of water that has been boiled; and his analysis of some boiling springs in Iceland.

BLACKALL, Offspring, an English prelate, born in London in 1654, died in Exeter in 1716. For two years after the coronation of William III. he refused to take the oath of allegiance, but finally yielded. In 1699 he engaged in a controversy with Toland, who had denied in his "Life of Milton" that Charles I. was the author of the "Icon Basilike," and expressed doubts of the genuineness of the Scriptures. Blackall was consecrated bishop of Exeter in 1707. His works, in 2 vols. folio, were published in 1723.

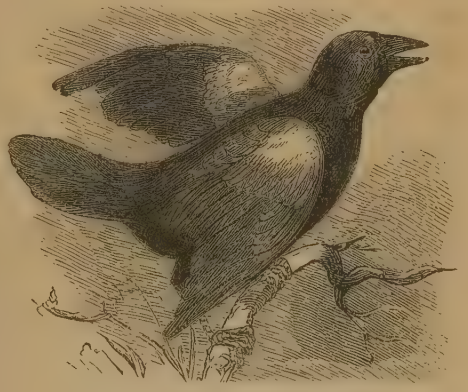
BLACKBERRY. See BRAMBLE.

BLACKBIRD, a N. E. county of Nebraska, separated from Iowa on the E. by the Missouri river, and watered by Blackbird, Middle, and Omaha creeks; pop. in 1870, 31.

BLACKBIRD. I. A European species of the thrush family (*turdus merula*, Linn.), called

Blackbird (Turdus merula).

also merle in France and some parts of England. The plumage is full, soft, and glossy; the length in the male is 10¾ inches, and the extent of wings 16 inches; the length in the female is 10 inches, and the extent of wings 15 inches. In the adult male the bill is five sixths of an inch long, and of a bright orange color, as are the mouth, tongue, and margins of the lids, the iris hazel, the feet and claws dusky brown, the heel and soles yellow; the general color of the plumage is deep black, sometimes slightly tinged with brown; the primaries are lighter, and obscurely edged with brown; the central part of the hidden portion of each feather is light gray. In the female, the bill is dark brown; the general color of the plumage is deep brown above, lighter beneath; the throat and fore neck pale brown, streaked with darker triangular spots. The young are dusky brown above, with dull yellowish streaks; pale yellowish brown, spotted with dusky, beneath. Albino specimens are occasionally seen. The blackbird is an admirable singer, its notes, though simple, being loud, rich, and mellow, most frequently heard in the morning and evening. It prefers cultivated districts, in winter frequenting the neighborhood of houses, and keeping in the shelter of the garden hedges. Its food consists of snails, seeds of grasses and grain, insects, larvæ, worms, berries of various kinds, and also fruits. It is a very shy and active bird, hopping on the ground with tail raised and wings loose; its flight along the hedges is fitful and wavering, but in an open field very steady and sustained. It is not gregarious, more than three or four being seldom seen together. The blackbird pairs in early spring, making a nest externally of grass stalks, twigs, fibrous roots, and mosses, the inside being lined with mud and afterward with dry grass; the nest is usually placed in a hedge, bramble thicket, or bushy pine. The eggs are from four to six in number, of a pale bluish green, spotted with pale umber. The female sits 13 days, the male singing till the young are hatched; two broods are commonly reared, one in May, the second in July. The flesh is excellent for food. The blackbird is often kept in cages, where its song is as joyous as in its native haunts; it is a troublesome species in an aviary, as it pursues and harasses other birds; in confinement it will eat crumbs and raw or cooked flesh. **II.** A bird more commonly called in New England red-winged blackbird, and belonging to the family of *sturnidæ* (*agelaius phœniceus*, Linn.). The bill is straight, strong, conical, and black; the hind toe and claw the stronger. The plumage of the adult male is glossy black, except the smaller wing coverts, the first row of which are cream-colored, the rest scarlet; the length is 9 inches, extent of wings 14 inches. The female is nearly 2 inches less;



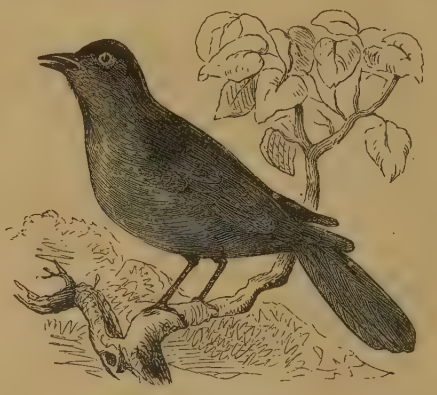
Red-winged Blackbird (Agelaius phœniceus).

the upper part black, the feathers with a pale brown margin, underneath streaked with black and dull white; a band of pale brown over the

eye, and some of the smaller wing coverts slightly tinged with red. According to Nuttall, this bird is found during the summer over the whole of North America from Nova Scotia to Mexico. It arrives in New York and New England about the 1st of April, preferring swamps, meadows, and low situations; at this season it lives on insects and grubs, afterward on the young and tender corn. It begins to build its nest early in May, on an alder bush or tuft of grass in some marsh or meadow; the eggs, from three to six, are white, tinged with blue, with faint purple marks. These birds congregate in such numbers in a very small space, that great havoc may be made at a single discharge of a gun. The flight is usually even; on the wing the brilliant scarlet of the coverts contrasts finely with the black of the general plumage. Some of its notes are agreeable to the ear. In August, when the young are ready to associate in flocks, they do considerable mischief to the Indian corn; they are then killed in abundance, and are very good eating. Such is their confidence in man, in spite of his persecutions, that when fired upon they only remove from one part of a field to another. **III.** The name blackbird is given in the northwestern states and Canada to the rusty grakle (*scolecophagus ferrugineus*, Wils.), and in other parts of the country to the purple grakle (*quiscalus versicolor*, Vieill.); both belong to the family *sturnidæ*, or starlings.

BLACKBURN, a town, parish, and parliamentary borough of Lancashire, England, 22 m. N. N. W. of Manchester; pop. in 1871, 76,337. It stands in the midst of a barren district, containing a number of valuable coal mines, to which, as well as to its proximity to the London and Liverpool canal, the importance of Blackburn as a commercial place is mainly to be ascribed. Cotton goods, especially of the coarser kinds, are manufactured to a great extent in the town and vicinity. Blackburn is irregularly built, but contains some fine edifices. In addition to a number of chapels, schools, public halls, &c., it has a magnificent church, rebuilt in 1819 at a cost of £26,000.

BLACKCAP. I. A bird of the family *luscinidæ*, or warblers (*sylvia atricapilla*, Briss.), a native of Europe, migrating to the north in early spring. The male has the upper parts light yellowish gray; the head black; cheeks, neck, and lower parts ash-gray, paler behind and tinged with yellow; wings and tail grayish brown; length to end of tail about 6 inches, extent of wings 9 inches. The female is a trifle larger, but is colored like the male, except that the upper part of the head is light reddish brown. It frequents woods and thick hedges, gardens and orchards. With the exception of the nightingale, it is considered the finest songster in Great Britain; its notes are full, deep, and mellow, and its trill is exceedingly fine; it will imitate very exactly the notes of the nightingale, thrush, and blackbird. Its song is continued from early in April to the end of June, the period of pairing and incubation. This bird is shy, going by short flights from one thick bush to another; it feeds on



Blackcap (Sylvia atricapilla).

insects, larvæ, and berries. The nest, which is placed in the fork of some shrub, is made of dried stalks of grass, bits of wool, moss, fibrous roots, and hairs; the eggs are four or five in number, about two thirds of an inch long, and very nearly as broad, grayish white, faintly stained and freckled with purplish gray and blackish brown. Both sexes sit upon the eggs. **II.** An American species of titmouse, belonging also to the *luscinidæ* (*parus atricapillus*, Wils.). It is 5¼ inches long and 8 in extent of wings. The bill is brownish black; whole upper part of the head and hind neck, and a large patch on the fore neck and throat, pure black; between these a white band, from the bill down the sides of the neck, growing broader behind and encroaching on the back, which, with the wing coverts, is ash-gray tinged with brown; lower parts brownish white; quills brown, and, with the secondaries, edged with white, leaving a conspicuous white bar on the wings; tail brown, white-edged. The Carolina tit (*parus Carolinensis*, Aud.) is almost precisely the same, being only an inch smaller. The blackcap is better known in New England as the chickadee, which is an imitation of its note as it explores the trees in search of the eggs and grubs of insects, which form its principal food. It destroys immense numbers of canker-worms, doing in this way eminent service to man; in the winter it comes near the houses, picking up seeds and crumbs which are thrown out of doors. It is an exceedingly lively bird, running over trees in all directions, and thrusting its bill into every crevice where an insect might creep. The severest cold does not affect its vivacity or numbers. The eggs are six to ten, of a white color, with brownish red specks, and are generally laid in holes excavated in trees by means of their bills.

BLACKCOCK, or **Black Grouse** (*tetrao tetrix*, Linn.), a highly prized game bird, of the family *tetraonidæ*, very generally spread over the

northern parts of Europe and Great Britain, particularly in the wild and wooded districts of Scotland. The male weighs sometimes as

Blackcock (Tetrao tetrix).

much as four pounds, and the female about two. In the male, the length to the end of the tail is about 23 inches, and the extent of wing 33 inches; bill an inch long, strong, and brownish black; the iris brown; over the eye a bare granulated skin of a scarlet color; the whole upper plumage of a steel-blue color, the scapulars and wings tinged with brown; the primaries brown, with brownish white shafts, the secondaries tipped with whitish, forming a bar across the wings, conspicuous in flight; the under wing coverts white, a few of them being visible when the wing is closed; the breast and sides brownish black, the abdominal feathers tipped with white; the legs and thighs dark brown, with grayish white specks, the former feathered to the toes; the lower tail coverts white, the upper brownish black; the tail, which is forked, with the lateral feathers curved outward, deep black. The female is about 18 inches long and 31 inches in extent of wings; she resembles the other females of the family in her less brilliant markings; the general color of the plumage is ferruginous, mottled and barred with black above, and with dusky and brown bars on a paler ground below; the tail is nearly even at the end, straight, and variegated with ferruginous and black; the white about the secondaries and bend of the wing is much as in the male. The favorite abode of the blackcock is in the highlands and glens, among the hills clothed with a luxuriant growth of birch, hazel, willow, and alder, with an undergrowth of deep fern; here they find abundant food and shelter from the winter's cold and summer's sun. Their food consists of tender twigs, berries, heaths, and occasionally the seeds from the stubble fields. Their flight is heavy, straight, of moderate velocity, and capable of being protracted. They perch readily on trees, but the ordinary station is the ground, on which they repose at night. The blackcocks are polygamous, and fight desperately for the females during April; having driven off all rivals, the male selects some eminence early in the morning, on which he struts, trailing his wings, swelling out his plumage and wattles over the eyes like a turkey cock; the females answer to his call and soon crowd around him. After the courting season the males associate together peaceably. The eggs are six to ten in number, of a dirty white color, with rusty spots, and are laid in a very rude nest on the ground, among the heaths; the young are reared entirely by the female, which they resemble in color. Their flesh is an excellent article of food. Foxes and rapacious birds kill great numbers of them.

BLACK DEATH. See PLAGUE.

BLACKFEET, or **Satsika,** the most westerly tribe of the Algonquin family of American Indians, with a dialect which differs greatly from others of the family. They were originally on the Saskatchewan; but from intestine dissensions the Satsika or Blackfeet proper separated from the Kena or Blood Indians, and retired to the Missouri, where the name Blackfeet was given to them by the Crows. A chief named Piegan or the Pheasant caused a second division, making three bands which continue to this day. They extend from the waters of Hudson bay to the Missouri and Yellowstone. They have always been great warriors, and, having early obtained horses, maintain their stock by robbery. They do not bury their dead. The warrior is left in his cabin in full array, and horses are killed at the door for his use. Their worship of Natous or the sun is clearly marked. Those in the United States are in Montana, and were estimated by the Indian bureau in 1870 at 7,500. Canadian authorities estimate those within the British lines at 6,000; but as they are constantly moving, a large number are reckoned by both. They have been constantly at war, carrying their predatory incursions into Oregon, but are now diminishing through intemperance, and becoming less formidable.

BLACKFISH, a name improperly given by seamen to several species of small whales, especially to the round-headed dolphin (*globicephalus*, Less.), (see DOLPHIN), and also in New England to a marine species of fish of the family *labridæ*, the tautog (*tautoga Americana*, De Kay). The latter abounds on the coast of New England, on both sides of Long Island, and off Sandy Hook, New Jersey. Originally they were not found north of Cape Cod; but between 1820 and 1830 a number of them were brought alive in boats to Massachusetts Bay, and being set free have spread all along the eastern coast of the continent. Its back and sides are black; the lips, lower jaw, and belly, in the males particularly, are white. The tail is entire, somewhat convex, the middle rays being somewhat longer than the external ones.

The body is covered with small, hard scales. They vary in size from 2 to 14 or 16 lbs. They are caught early in the spring, and through

Blackfish (Tautoga Americana).

the summer, from off the rocky ledges of the coast, or from boats anchored over the reefs. The fishing for them is a favorite sport in the warm summer weather, and the fish, though of dry flavor, are much esteemed when baked.

BLACK FLUX, a mixture of carbonate of potash and carbon, obtained by deflagrating two or three parts by weight of cream of tartar (or crude argol) and one part of nitre in a red-hot earthen crucible. If equal weights of these substances be taken, the nitric acid of the saltpetre will oxidize the carbon, and the result will be a pure carbonate of potash, or white flux. When black flux is fused with the oxides of copper, iron, or lead, or with the acid compounds of those metals, the carbon acts as a reducing agent, while the carbonate of potash takes up the impurities, such as sulphur and silica. The reduced metal collects in a button in the fluid slag, and on cooling can be easily separated from its matrix. Black flux must be kept in closely stoppered bottles, as it rapidly deteriorates by absorption of water from the air.

BLACK FLY, a small dipterous insect, sometimes called gnat, midge, and sand fly, belonging to the genus *simulium*. The length of the common species (*S. molestum*) is about one tenth of an inch; the color is black, with transparent wings; the legs short, with a broad whitish band around them. They begin to appear in northern New England in May, and continue about six weeks; after them, however, comes another species (*S. nocivum*), more numerous and smaller. These insects are a perfect pest in the subarctic regions, and so abundant in their season in the woods from Labrador to Maine, that travellers and anglers, unless of the most determined character, rarely venture far from the seashore. In bright still days they are innumerable, swarming in houses, flying in one's face, crawling under tightly fitting garments, and there remaining, biting even in the night. Human beings and even dogs pass their lives at this season in a state of continual torment, much worse than amid the mosquitoes of the south. In cloudy weather, unlike the mosquito, they disappear. The bite is severe and stinging, each showing a point of blood, and followed by an irritation and swelling which last several days. No veils nor gloves protect against their attack, as their small size enables them to penetrate wherever they choose. The best remedy seems to be a viscid ointment, into which tar enters, and which arrests and destroys them. The smaller midges which succeed them, called no-see-'em by the Indians from their minuteness, would hardly be seen were not their wings whitish mottled with black; they come forth in myriads toward evening, creeping under clothes, their bites feeling for the moment as if caused by sparks of fire; they do not draw blood, and there is rarely any swelling produced; they are most troublesome in July and August, and nothing seems available against their swarms, unless a thick smoke, quite as disagreeable, be considered a remedy. The larva and pupa are both aquatic, and the former is in some ponds as injurious to the raiser of young trout and other fish as the adult insect is to the angler for the adult fish. The larva, according to Mr. S. Green, spins webs under water as perfect as those of the spider, with equal mechanical ingenuity and rapidity, and in the same way, by fastening the threads at different points and going back and forth till the web is finished; the web is strong enough to destroy the fish while provided with the umbilical sac, by getting wound round the fins, head, and gills. The buffalo gnat of the western prairies, a much larger species, has been known to bite horses to death; and an allied fly (*rhagio*), according to Westwood, is a great pest to man and beast on the confines of Hungary and Servia, and, it is said, will destroy cattle.

BLACKFORD, an E. county of Indiana, drained by the Salamonie river; area, 180 sq. m.; pop. in 1870, 6,272. It is traversed by the Fort Wayne, Muncie, and Cincinnati, and a branch of the Pittsburgh, Cincinnati, and St. Louis railroad. The surface is diversified by plains and rolling lands, and the soil is fertile. The chief productions in 1870 were 82,763 bushels of wheat, 75,346 of Indian corn, 14,567 of oats, 111,106 lbs. of butter, and 24,068 of wool. There were 2,646 horses, 1,720 milch cows, 1,685 other cattle, 7,820 sheep, and 5,863 swine. Capital, Hartford.

BLACK FOREST (Ger. *Schwarzwald;* anc. *Silva Marciana*, the S. W. branch of the Hercynian forest), a range of woody mountains in the S. W. part of Germany, traversing Baden and Würtemberg, and forming the eastern boundary of a portion of the basin of the Rhine, the corresponding western being formed by the Vosges. It extends about 90 m. in length, almost parallel with the course of the Rhine, from which it is distant in many places less than 20 m., and has a breadth in its southern part of about 30 m., and in its northern part

of about 18. The Black Forest consists of elevated plains or table land, and describes itself upon the horizon in regular undulating lines. Its greatest elevation is near and to the east of Freiburg, in the region where the Wiesen takes its rise, and where is the famous defile called Hölle, a narrow valley surrounded by lofty mountains, and celebrated in the retreat of Moreau in 1796. The highest summits of the range, the Feldberg, the Belchen, and the Kandel, are between 4,000 and 5,000 ft. above the level of the sea. The descent of the Black Forest toward the Rhine is very abrupt, causing the rivers which take their rise on this side, the Murg, Kinzig, and Elz, to assume during the rains the character of torrents. The eastern slope is very gentle, and gives rise to the Neckar and the Danube, the former soon changing its direction to the north and west, and joining the Rhine. The Black Forest is composed mainly of granite, though the surface is in some places covered with sandstone, and gneiss appears around its base. On some of the heights porphyry is found, and there are many mines of silver, copper, iron, lead, and cobalt. Its mineral waters too, especially those of Baden and Wildbad, are very famous. The summits of the Black Forest are during eight months of the year covered with snow; they are generally destitute of trees, and except during the greatest heats of summer display no verdure. Descending from the top, the first trees that appear are the pine, the beech, and the maple; these are succeeded by the dense forests of fir with which all the middle and lower parts of the mountains are covered, and which furnish masts and timber for ships. Near the foot of the mountains are many picturesque valleys, of which that of the Murg, situated near the thermal waters of Baden, is particularly distinguished for its natural beauty. Villages and hamlets are interspersed, and the inhabitants are mainly engaged in rearing live stock, and in the manufacture of toys. The most famous of these articles is the wooden clock, of which it is estimated that 180,000 are annually produced. Agriculture is there of little importance, the soil being unfruitful and the climate severe, yet the valleys produce excellent fruit. The Black Forest abounds in historical remains and associations.

BLACK GUM, the arbitrary name of a tree without gum, a species of *nyssa* or *tupelo* (Adanson), which is the only genus of Endlicher's sub-order *nyssaceæ* of his order *santalaceæ*. Linnæus had it in *polygamia dicœia;* Elliot placed it in *dicœia pentandria,* and Darlington in *pentandria monogynia.* The black gum is the *N. multiflora,* and is known in New England as snag tree and hornpipe, in New York as pepperidge, and as the gum tree in the middle states. It thrives in low, clayey soil, and in dense forests grows to a height of 40 ft. Its external habits are various, and it is often confounded with other trees. It has very many branches, which are often crooked; a dense pyramidal head; leaves one to five inches long, and of a lustrous green, in tufts of four or more at the ends of the branches; green-

Black Gum Tree (Nyssa multiflora).

ish flowers in clusters, ripening to blue-black; mouse-colored bark in longitudinal furrows. The wood is close and tough, and resists splitting, though it decays sooner in the weather than that of the elm. It is used for water

Black Gum, Leaves and Fruit.

pipes in the salt works at Syracuse; it is also good for hatters' blocks, wheel naves, and cog wheels. The tree is very vigorous. It was introduced into Europe as an ornamental tree in 1739; it thrives in the south of England, and even in Hanover.

BLACK HAWK, an Indian chief of the Sac and Fox tribe, born about 1768, at the principal Sac village on the E. shore of the Mississippi, near the mouth of Rock river, died at the village of his tribe on the Des Moines river, in

Iowa, Oct. 3, 1838. About 1788 he succeeded his father as chief of the Sacs. In 1804 some of the chiefs of the Sacs and Foxes sold their lands, extending for 700 m. along the Mississippi, for an annuity of $1,000. Black Hawk said that the chiefs were drunk when they signed the treaty. During the war of 1812 he took part with England. The treaty of cession was ratified in 1815, and sanctioned by a new treaty in 1816, which was signed by Black Hawk. In 1823 the greater part of the tribes removed to their reservation across the Mississippi; but Black Hawk and his followers remained behind. In 1831, the land occupied by their villages having been sold to settlers, the crops of the Indians were ploughed up. Black Hawk threatened to retaliate, and the militia of Illinois were called out. He then retreated across the river, and engaged not to reënter the state without permission. But in the spring of 1832 he recrossed the river; a band of 50 of his warriors were attacked by the militia and put to flight. The Indians now scattered into squads, and began an indiscriminate massacre of the whites. Gen. Scott was sent against them; but cholera broke out among the troops and hindered their operations. The Indians were finally driven to the Wisconsin river, where they were defeated on July 21 by Gen. Dodge, and on Aug. 2 by Gen. Atkinson. Black Hawk was captured, and a treaty was made by which the land of the tribes was sold, and the Indians, numbering about 3,000, removed to the region about Fort Des Moines. Black Hawk, two of his sons, and seven of his warriors, were for a time detained as hostages, taken through the principal cities of the eastern states, and then confined in Fortress Monroe till June 5, 1833, when they were released and rejoined their tribes.

BLACK HAWK, a N. E. county of Iowa, intersected by the Cedar and Wapsipinicon rivers; area, 576 sq. m.; pop. in 1870, 21,706. The Dubuque and Sioux City, the Burlington, Cedar Rapids, and Minnesota, and the Cedar Falls and Minnesota railroads traverse the county. The surface is occupied mainly by prairies, though portions of it are well wooded. The chief productions in 1870 were 1,306,824 bushels of wheat, 902,128 of Indian corn, 570,340 of oats, 109,771 of potatoes, 29,235 tons of hay, 17,226 lbs. of wool, and 506,844 of butter. There were 7,456 horses, 6,407 milch cows, 8,004 other cattle, 4,479 sheep, and 13,438 swine. Capital, Waterloo.

BLACK HILLS, a range of mountains in S. W. Dakota and N. E. Wyoming, lying near the parallel of 44° N. latitude and between lon. 103° and 105° W., about 100 m. long and 60 m. wide. They are a continuation of the Big Horn and Snow mountains, which branch off from the Rocky mountains. The base of these hills is about 2,500 or 3,000 ft. above the sea, and the highest peak is 6,700 ft. About one third of their area is covered with vast forests of magnificent pine trees. Their geological formation indicates great mineral wealth. Gold has been discovered, and it has been conclusively proved that this region abounds in iron, coal, lead, salt, and petroleum, besides its valuable pine and cedar timber, limestone, and good stone for building purposes.

BLACK HOLE, a small close dungeon in Fort William, Calcutta, in which on the capture of Calcutta by Surajah Dowlah, June 20, 1756, the British garrison, consisting of 146 men, under the command of Mr. Holwell, were locked up for the night. It was a strongly barred room, 18 ft. square. There were only two windows, both opening toward the west, whence under the best of circumstances but little air could enter, which was further obstructed by a projecting veranda outside, and thick iron bars within. At the same time conflagrations raging in different parts of the fort gave the atmosphere an unusual oppressiveness. In a short time their sufferings from thirst and the foul and stifling air became terrible, and in a few hours several had died. Only 23 survived till morning, when they were released. Among these was Mr. Holwell, who published a narrative of the event in the "Annual Register" for 1758. The black hole is now used as a warehouse, and an obelisk 50 ft. high, erected in memory of the victims, stands before the gate.

Monument in front of the Black Hole.

BLACKIE, John Stuart, a Scottish author, born at Glasgow in July, 1809. He is the son of a banker, studied in Scotland, Germany, and Italy, and was professor of Latin literature in Marischal college, Aberdeen, from 1841 to 1852, when he became professor of Greek in the university of Edinburgh, which position he still holds (1873). He promoted university reform in Scotland and the abolition of the test act. He is a popular lecturer and an active contributor to periodicals and cyclopædias. His writings include a metrical translation of Goethe's "Faust" (1834), and of Æschylus (1850); "Poems, chiefly on Greek Mythology" (1857);

"Poems, English and Latin" (1860); "Homer and the Iliad," with a translation of the Iliad in ballad measure (1866); *Musa Burschicosa* (1869); and "War Songs of the Germans," with historical sketches (1870). He has also published "Critical Dissertations" (3 vols.), and "Notes Philological and Archæological" (4 vols.). His discourse on "Democracy" (1867) has passed through many editions, and his latest work is "Four Phases of Morals" (1872).

BLACKING, a preparation applied to leather, designed either to preserve or to polish it. Ivory black, vinegar or sour beer, sugar or molasses, and a little sweet oil and sulphuric acid are the common ingredients. The corrosive properties of the acids are neutralized by the lime in the ivory black. It is made in the form of a paste, and also liquid. The following recipe (patented in England) is designed to give the leather somewhat of a waterproof quality: Dissolve 18 oz. of caoutchouc in 9 lbs. of hot rape oil; to this add 60 lbs. ivory black and 45 lbs. molasses, with 1 lb. finely ground gum arabic, previously dissolved in 20 gallons of vinegar, of strength No. 24; the whole to be well triturated in a paint mill till smooth. Then add, in small successive quantities, 12 lbs. sulphuric acid, stirring strongly for half an hour. The stirring is to be continued for half an hour a day during a fortnight, when 3 lbs. of gum arabic, in fine powder, are to be added, and the half hour's daily stirring continued another fortnight, when it is ready for use. For paste blacking the same ingredients and quantities are used, except that instead of 20 gallons of vinegar, 12 gallons will answer, and a week of stirring only is required. A good blacking is also made more simply by mixing 3 oz. of ivory black, 2 of molasses, a table-spoonful of sweet oil, 1 oz. of sulphuric acid, and 1 of gum arabic, dissolved in water and a pint of vinegar.—An excellent blacking for harness is prepared by melting 2 oz. of mutton suet with 6 oz. of beeswax, to which are to be added 6 oz. of sugar candy, 2 oz. of soft soap dissolved in water, and 1 oz. of indigo finely powdered, and, when melted and well mixed, a gill of turpentine. It is to be put on with a sponge and polished with a brush.—Blacking for stoves may be made of finely powdered black lead, of which ½ lb. may be mixed with the whites of three eggs well beaten. The mixture is then to be diluted with sour beer or porter well stirred, and heated to simmering for about half an hour.

BLACK JACK. See BLENDE.

BLACK LEAD. See GRAPHITE.

BLACKLOCK, Thomas, D. D., a Scottish clergyman, born at Annan, Nov. 10, 1721, died in Edinburgh, July 7, 1791. He became blind at the age of six months. His father, who was a mechanic, used to read to him from the best English authors. He early acquired a knowledge of Latin, and at 12 produced creditable verses. Through the assistance of Dr. Stevenson of Edinburgh he was enabled to pursue a course of study at the university, and became proficient in the classical and modern languages and music. A quarto edition of his poems was published in 1756, in London, by subscription. In 1759 he was licensed as a minister of the gospel. He married in 1762, and was ordained minister of Kirkcudbright; but in 1764 he resigned, and retired to Edinburgh on a small pension, which he eked out by instructing a few young men. He wrote several philosophical and theological works.

BLACK MAIL, a tribute formerly paid by the occupants of lands in the northern counties of England to some Scottish chieftain for protection against the depredations of border rievers or moss troopers. At a later period, after civil order had been established in the border counties, and agriculture and peaceful habits prevailed in the lowlands of Scotland, the custom of paying black mail to the highland chiefs by the lowland farmers became common, and continued till within a century. The origin of the term in this sense is doubtful, some deriving it from the signification of "rent in kind," which mail had in the old English and Scotch law; others, from the moral blackness of the custom.—The modern sense of "hush money, extorted by threats of exposure," evidently had its origin in the compulsory character of the old tribute.

BLACKMAN, George Curtis, an American surgeon, born in Connecticut, died at Avondale, Ohio, July 19, 1871. He took his medical degree in 1841 at the college of physicians and surgeons, New York. After spending some time as surgeon of a packet ship between this country and Great Britain, he commenced practice in one of the towns upon the Hudson river. In 1854 he was appointed professor of surgery in the medical college of Ohio at Cincinnati. He was a bold and skilful operator, and there were hardly any great operations in surgery which he did not perform, and many of them he repeated several times. He translated and edited Vidal's "Treatise on Venereal Disease," and reëdited Mott's translation of Velpeau's "Surgery," with notes and additions of his own. He was surgeon to two of the Cincinnati hospitals. During the civil war, from 1861 to 1865, he served as medical officer, and was present at the battles of Shiloh and the Wilderness.

BLACKMORE, Sir **Richard,** an English physician, poet, and miscellaneous writer, born at Corsham, Wiltshire, about 1650, died Oct. 8, 1729. After spending several years at Oxford and on the continent he settled in London, and became physician to William III. He wrote several medical and religious treatises, "The Accomplished Preacher," a new version of the Psalms, two volumes of essays, and a volume of miscellaneous poems; but he is best known by his heroic poems, "Prince Arthur," "King Arthur," "King Alfred," "Eliza," and "The Redeemer," and by his "Creation," a philosophical poem. These poems were mercilessly

attacked by the wits, and especially by Pope in the "Dunciad;" in reply he wrote the "Satire upon Wit." His name has come to be a synonyme for dulness; but his "Creation" has been praised by Addison, Johnson, and other high authorities.

BLACK MOUNTAINS, the culminating group of the Appalachian system (see APPALACHIAN MOUNTAINS), named from the dark growth of balsam firs and other evergreens which cover their summits, situated in Yancey and Buncombe counties, North Carolina, between the main central ridges on the west and a portion of the Blue Ridge on the east. Unlike the other ridges of the Alleghanies, they lie for the most part transverse to the general trend of the range, and give this direction to the great valleys and rivers included between them. They rise from a district of great elevation, the height of the valley at Asheville, on the French Broad River, being about 2,000 ft. above the sea, and that of Toe river at Burnsville, Yancey county, about 2,500 ft. From this plateau the drainage is toward the Ohio in a northerly direction by the branches of the Great Kanawha, by those of the Holston and the French Broad toward the southwest, and by those of the Yadkin and the Catawba into the Pedee and Santee toward the southeast. This position at the sources of streams flowing in such diverse directions long since pointed out this district as probably the most elevated east of the Rocky mountains. The botanists Michaux, father and son, were led to the same opinion by their observations upon the northern character of the forest growth with which these mountains are covered. In 1835 the first attempts to determine the elevation of the greatest heights were made by Dr. E. Mitchell, professor in the university of North Carolina at Chapel Hill. The principal peak, called Clingman's peak, but known in North Carolina as Mt. Mitchell, he estimated to be 6,476 ft. above the sea; and in 1844 he visited the locality again, and made the height 6,672 ft. In 1855 the Hon. T. L. Clingman of North Carolina made the elevation 6,941 ft., and in 1856 Prof. Guyot determined the highest point, which he then called the Black Dome, to be 6,760 ft. high. The following are the elevations and names of the 12 highest points, all of which are higher than Mt. Washington in New Hampshire, as published in 1857 from the investigations of Prof. Guyot:

BLACK MOUNTAINS.

1.	Clingman's Peak	6,701
2.	Guyot's Peak, or Balsam Cone	6,661
3.	Sandoz Knob	6,612
4.	Hairy Bear	6,597
5.	Cat-Tail Peak	6,595
6.	Gibbe's Peak	6,586
7.	Mitchell's Peak	6,576
8.	Sugar-Loaf, or Hallback Peak	6,401
9.	Potato Top	6,389
10.	Black Knob	6,377
11.	Bowler's Pyramid	6,345
12.	Roan Mountain	6,318

The summit of Mt. Washington is 6,285 ft. above the level of the sea. In 1857 Dr. Mitchell lost his life in a third excursion to these mountains, for the purpose of establishing his claim to having first measured the elevation of the highest summit, the honor of which was also claimed by the Hon. Mr. Clingman.

BLACK RIVER. I. A river of New York, which rises in Herkimer county, pursues a N. W. course through Oneida and Lewis counties, and as far as Great Bend, in Jefferson county, and thence flows W. by Watertown, and empties through Black River bay into Lake Ontario. Near Turin, in Lewis county, it has a fall of about 63 ft. Below the fall it is navigable to Carthage, a distance of 40 m. From Carthage to Watertown is a series of rapids, rendering navigation almost impossible. A canal has been opened from the upper falls to Rome on the Erie canal. The whole length of the river is 125 m., and its breadth at Watertown (6 m. from its mouth) is 60 yards. **II.** See BIG BLACK RIVER.

BLACK SEA (anc. *Pontus Euxinus*, the hospitable sea), an inland sea between Asia and Europe, enclosed N. and E. by Russia and S. and W. by Turkey, and connected N. E. with the sea of Azov through the strait of Yenikale, and S. W. with the Mediterranean through the Bosporus, the sea of Marmora, and the Dardanelles. It lies between lon. 27° 25′ and 41° 50′ E., and lat. 40° 50′ and 46° 45′ N. Its extreme length is 700 m. from E. to W., its extreme breadth nearly 400 m. on the 31st meridian. It has a coast line of more than 2,000 m., and a superficial area of about 180,000 sq. m. It receives from Europe the waters of the Danube, Dniester, Bog, and Dnieper, and through the sea of Azov those of the Don, and from Asia the waters of the Kizil Irmak (Halys) and Sakaria, besides smaller rivers, and drains a territory in Europe and Asia of scarcely less than 1,000,000 sq. m. There are geological indications that the Black sea was at one time much larger than it is now, having no outlet to the Mediterranean, flooding a considerable part of southern Russia, and reaching even to the Caspian and Aral seas, with which it formed one body. Natural features probably assisted in suggesting the name of Black, which is given it in all modern European languages. The ancient name, Euxine, is supposed to have been a euphemistic modification of a former appellation, Pontus Axenus, meaning inhospitable sea. The prevalent wind is from the N. E.; it comes laden with moisture from a wide swampy territory, and frequently veils the sea in darkness by fogs and rain. Owing, too, to the confined extent of the water, a strong wind quickly lashes it into a tempest, and gives to the whole sea something of the appearance of a whirlpool. These brief but troublesome tempests are especially frequent during the winter. The difficulties which the atmosphere offers to the navigation of the Black sea are compensated by the character of the sea itself. Both its shores and its interior

parts are remarkably free from rocks, sand banks, or shallows, and ships may always lie to or ride at anchor with very little danger. There is but one island in the whole sea, Serpent isle, 30 m. from the mouth of the Danube, once a sacred place, with a temple, but unoccupied for centuries, till of late years it was made a station for English and French vessels. There is now a lighthouse upon it. The principal peninsulas are on the north, among them the Crimea. The depth of the sea increases regularly according to the distance from the shore; and in its central parts no bottom is reached even by a line of 160 fathoms. There is no observable ebb and flow of its waters, but its large accessions from the rivers occasion strong currents, which all set, with more or less directness, toward the Bosporus. When these currents are also helped by the winds, the waters are sent through the straits with such violence that vessels are sometimes detained for months outside, unable to enter against them. An English surveying ship recently confirmed the conclusion of Prof. Carpenter that these currents are only superficial, and discovered at the depth of 20 fathoms an undercurrent running with prodigious force into the Black Sea. To test the strength of this undercurrent, a special apparatus was constructed and attached to the ship's boats, when the boats were in many places driving along against the upper current with greater velocity than that of the steam launch of the ship. Its climate has wide extremes, but is generally colder than would be inferred from its latitude, owing to the prevalence of north winds. Its fisheries are unimportant. The specific gravity of its water is 1·142. It contains less salt than the ocean, and freezes easily. Odessa is the most important commercial port on its coast, and Varna is the chief Turkish fortress; besides which, the principal harbors are Sebastopol, Sinope, and Trebizond, and on the estuaries of the Bog and Dnieper, respectively, Nikolayev and Kherson.—The shores of the Black sea are known both in fable and history. Colchis, the goal of the Argonautic expedition, was on its east; the Cimmerian region was upon its north; and on all its sides the Persian, Byzantine, Turkish, and Russian powers have acted the events of their history. From the time of Constantine till the 15th century it was the centre of the transplanted Roman world; and till the Cape of Good Hope was discovered and sailed round, it was a passageway of the Genoese and other European trade with the Indies. The Turks for a time excluded the ships of all other nations from it, and at one time Russia sought to make it a closed sea under its own military command; but since the peace of Paris, which terminated the Crimean war, it has been open to the commerce of all nations, and the equal exclusion of all ships of war established by the neutrality clause of that treaty was abrogated at the close of 1870.

Opening of the Black Sea from the Bosporus.

BLACK SILVER (called also brittle silver or glance, and stephanite from the Archduke Stephan, mining director of Austria), an ore composed of sulphur 16·2, antimony 15·3, silver 68·5. It occurs in veins with other silver ores at Freiberg in Saxony, at Andreasberg in the Hartz, and at Zacatecas in Mexico. It is also an abundant silver ore in the Comstock lode in Nevada, and occurs in Idaho and in the Reese river and Humboldt mines. Crystals of it have been found altered to pure silver.

BLACK SNAKE (*coluber constrictor; C. bascanion*, B. and G.), a very common snake, generally distributed over North America. The head is oval and long; the snout prolonged and rather pointed; the nostrils are lateral, very large near the snout, and open outward and a little backward; the eyes are large and bright, the pupil black, and the iris very dark gray; the body is long and slender, and covered with large smooth scales above, and with broad plates below; the tail is also long and slender, and, according to Holbrook, may be used as a prehensile instrument; according to Dr. Storer, the abdominal plates are 184, and the caudal scales 85. The color above is a dark bluish black; below, slate-colored; chin and throat pure white, with occasionally a few black spots; the margin of the jaws and snout yellow. The usual length is from 4 to 5 ft., of which the head is 1½ inch, and the tail about 16 inches; one was killed at Hingham, Mass., in 1842, 7 ft. long, which had enfolded and severely crushed in its coil a rabbit, and which had in its body 15 quails' eggs unbroken, and some of them containing the young bird. It is very active, being from its rapid motions frequently called "the racer;" it climbs trees with easy facility, and is often found entwined around bushes containing birds' nests. It frequents shady and shrubby places near ponds and streams, though it is very fond of basking in the sun. It feeds on mice, moles, frogs, toads, lizards, eggs, and young birds; the larger specimens prey upon squirrels, chickens, and even young rabbits; it is very destructive to young birds, and a noted robber of nests. Its first specific name indicates that it possesses the power of destroying its prey by the constriction of its folds; this power is known to many a schoolboy, around whose leg or arm it has coiled when the human robber of birds' nests has come into contact with the serpent thief similarly inclined. The one killed at Hingham had a rabbit in its coil; but it doubtless seizes its smaller and ordinary prey with its mouth only. It is very daring, and during the breeding season will often attack persons passing at a distance; its bite is perfectly harmless. There is no good evidence that it has any power of fascination, as implied in the second specific name above given, its victims being taken by activity and direct assault.

Black Snake.

BLACKSTONE, a town of Worcester county, Mass., 36 m. S. W. of Boston and 13 m. N. W. of Providence, bordering on Rhode Island, and intersected by Blackstone river; pop. in 1870, 5,421. It contains a bank and several schools and churches, 4 cotton mills, with 42,720 spindles, producing 10,000,000 yards of cloth annually, and 5 woollen mills, with 45 sets of machinery; annual value of product, $2,000,000. The Boston, Hartford, and Erie, and the Providence and Worcester railroads pass through the town.

BLACKSTONE, William, the first white inhabitant of Boston, died on Blackstone river, a few miles north of Providence, May 26, 1675. He is supposed to have been a graduate of Emanuel college, Cambridge, and to have been a clergyman of the church of England. He settled upon the present site of Boston about 1623. In April, 1633, he removed to Rhode Island.

BLACKSTONE, Sir William, an English lawyer, born in London, July 10, 1723, died there, Feb. 14, 1780. He was the posthumous son of a silk mercer, and lost his mother before he was 12 years old. His maternal uncle provided for his early education, and in his 7th year placed him at the Charterhouse school, where after the death of his mother he was admitted upon the foundation. Before he was 16 he entered Pembroke college, Oxford, and in 1741 he was entered at the Middle Temple, bidding adieu to poetry in "The Lawyer's Farewell to his Muse." In 1743 he was elected a fellow of All Souls' college. Having been admitted to the bar in 1745, he spent the succeeding seven years in attendance upon the courts at Westminster, but failed to obtain a remunerative practice, and resolved to abandon the profession. In 1749 he had been appointed recorder of Wallingford, in Berkshire, and he continued to discharge the duties of that office for 20 years. He was also steward of All Souls' college, and for six years assessor of the vice chancellor's court. In 1753 he opened a course of lectures at Oxford upon the English constitution and laws, which were the germ of his "Commentaries." For the purpose of establishing a permanent course of a similar character, Mr. Viner, author of the "Abridgment of the Common Law," founded at Oxford a professorship of the common law, and Blackstone was elected the first incumbent of the chair in 1758. He held the professorship for seven years, winning a wide reputation, which enabled him to return to the bar, where he immediately obtained a lucrative practice. In 1761 he was elected to parliament from Hindon in Wiltshire, and the following year he was made king's counsel. He had previously declined the office of chief justice of the Irish common pleas, and in 1770 he also declined the office of solicitor general. Subsequently he was successively justice of the king's bench and

the common pleas until his death. His "Commentaries on the Laws of England" were published in 4 vols., at Oxford, 1765–'9. Before the publication of this work there was no modern treatise presenting as a whole the system of English jurisprudence. Blackstone was compelled to collect his materials from an immense mass of statutes, reports, digests, abridgments, old charters, and ancient treatises. He succeeded in weaving out of this incongruous mass so methodical a whole, set forth in so easy and perspicuous a style, that his work continues, both in England and America, to be the first text book placed in the hands of the student of law. In parliament Blackstone was a uniform supporter of the government. Several American editions of the "Commentaries" have been published, the most noted being those by Prof. Tucker of Virginia, Judge Sharswood of Pennsylvania, and Judge Cooley of Michigan. Prof. Tucker's was accompanied with an elaborate exposition of his views of the constitution of the United States.

BLACKSTONE RIVER, a stream which rises in Paxton and Holden townships, Worcester co., Mass., and flows S. E. into the state of Rhode Island, where it is called the Pawtucket. It affords abundant water power, and for a great part of its course flows through an almost continuous village of manufacturing establishments. The scenery of the narrow valley is attractive. The Blackstone canal, extending through it from Worcester to Providence, was completed in 1829, but was superseded by the introduction of railroads, only portions of it being now in use for water power and irrigation.

BLACK VOMIT, the last vomiting, in many cases of yellow fever, of a dark mucous-looking fluid, like coffee grounds. It is regarded as a fatal symptom. The disease itself is sometimes called by this name. The blood is blackened and partially coagulated by a free acid, perhaps acetic and hydrochloric acids, which form in the system.

BLACKWALL, a suburb of London, at the junction of the Lea with the Thames, 4 m. E. S. E. of St. Paul's. It has founderies, ship yards, and the India docks. An elevated railway connects it with the city.

BLACK WALNUT. See WALNUT.

BLACK WARRIOR, a river of Alabama, rises in the N. E. part of the state, flows S. W. and S., and empties into the Tombigbee just above Demopolis, Marengo co. Its course is through the valuable Warrior coal field; iron is found along its banks. In the S. E. corner of Walker county it receives its principal tributary, Mulberry fork. Above this point it is also known as Locust fork. The river is navigable for steamboats to Tuscaloosa, at which point the water during floods rises to a height of 50 feet. The length of the main stream is nearly 150 m.

BLACKWATER, a river of Ireland, rising in the N. E. part of county Kerry, flows E. across county Cork and the S. W. part of county Waterford, and enters the sea at Youghal harbor. Its course of 100 miles is through a carboniferous limestone basin, amid beautiful scenery. It abounds in salmon.

BLACKWELL, Alexander, a Scottish physician, born in Aberdeen about the beginning of the 18th century, executed in Sweden, Aug. 9, 1748. He practised medicine in London, set up a printing establishment, and becoming bankrupt in 1734 was supported by the proceeds of the "Curious Herbal," which he published in 1737–'9, illustrated by his wife. He subsequently published a work upon the improvement of barren and sterile lands and the drainage of marshes, which attracted the attention of the Swedish government. Having been summoned to Sweden, he was engaged for some time in putting his theories into practice, but was convicted of conspiring against the royal family, and beheaded.

BLACKWELL, Elizabeth, an American physician, born in Bristol, England, in 1821. Her father emigrated with his family in 1831, and settled in New York, but removed in 1837 to Cincinnati, Ohio, where he died a few months afterward, leaving a widow and nine children almost destitute. Elizabeth, then 17 years old, opened a school, which she conducted successfully for several years. Having resolved to become a physician, she obtained a situation as governess in the family of Dr. John Dixon of Asheville, N. C., where she remained a year, having access during that time to a medical library, and receiving from Dr. Dixon some direction as to her reading. At the end of the year she removed to Charleston, S. C., still acting as a teacher of music, but pursuing her studies. She next went to Philadelphia, and passed six months in study under Dr. Allen and Dr. Warrington of that city. During that time she made formal application to the medical schools of Philadelphia, New York, and Boston, for admission as a student. In each instance the request was denied, on the ground of a want of precedent for such an admission, and of the impropriety of such an innovation upon established custom. She was finally, however, admitted to the medical school at Geneva, N. Y., where she took her degree of M. D. in regular course in January, 1849. During her connection with the college, when not in attendance there upon lectures, she pursued a course of clinical study in Blockley hospital, Philadelphia. The spring after her graduation she went to Paris, and remained six months as a student in the Maternité hospital, devoting herself to the study and practice of midwifery. The next autumn she was admitted as a physician to walk the hospital of St. Bartholomew in London. After nearly a year spent there she returned to New York, where she has since practised her profession with success. In 1852 she published a treatise entitled "The Laws of Life." In 1854, with her sister Emily, she opened the New York infirmary for women and children, and in 1859 again visited London, and delivered a course of medical lectures.

BLACKWELL'S ISLAND, the site of several of the charitable and penal institutions of the city of New York. It lies in the East river, opposite the city from 50th to 84th street, is 1¾ m. long and ⅛ m. wide, and is included in the 19th ward. (See New York.)

BLACKWOOD, William, a Scottish bookseller and publisher, born in Edinburgh, Nov. 20, 1776, died Sept. 16, 1834. He was apprenticed to a bookseller, and conducted business successively in Glasgow and London till 1804, when he established himself in Edinburgh as a dealer in old books. In 1817 he commenced the publication of "Blackwood's Edinburgh Magazine," of which he was the conductor, although he availed himself of the advice and assistance of Wilson, Lockhart, and others. The magazine soon acquired popularity, and became the acknowledged organ of the tory party in Great Britain. "Blackwood" has contained contributions from many of the foremost writers of its day; and several novels of acknowledged merit first appeared in its pages, including "The Caxtons," "My Novel," and "What Will he Do with it?" by Bulwer. The "Noctes Ambrosianæ," mainly written by Wilson, extending to 71 numbers, was begun in 1822, and continued with occasional intermissions till 1835. The house founded by William Blackwood is one of the leading publishing firms in Great Britain, and its principal place of business has for some years been in London.

BLADDER, a musculo-membranous bag, cyst, or pouch, which serves as a reservoir for the urine secreted in the kidneys. It is called *vesica urinaria*, to distinguish it from the gall bladder, a small cyst connected with the liver and the biliary ducts as a reservoir for bile. The bladder is situated in the pelvis, immediately behind the *symphysis pubis*, and in front of the rectum or terminal portion of the intestines in the male—in front of the uterus and vagina in the female. Thus placed in the lowest portion of the trunk in front, it communicates by means of two long tubes called ureters with the two kidneys, placed high up in the back, just above the lumbar region, on each side of the vertebral column. It communicates with the exterior by means of a single tube called the urethra, through which the urine is voided. In infancy it is of a pyriform shape, and situated almost entirely in the abdomen; it undergoes a change of form in the adult, and sinks deeper in the pelvic cavity. It then assumes the shape of a short oval, compressed in its anterior and posterior walls; its lower surface expands on the rectum, and forms what is termed by anatomists the bas-fond of the bladder. In the female its transverse diameter is greater than it is in the male, owing to the position of the uterus and vagina between the bladder and the rectum. It increases in dimensions with advancing age, and is larger in females than in males, probably from habitual distention, arising from constraint. The direction of the bladder is oblique, being inclined forward and upward. It is retained in its position by ligaments. Anatomists have divided it into six regions or surfaces, for the facility of description and surgical operation; these are named anterior, posterior, superior, inferior, and left and right lateral. The anterior surface lies behind the symphysis pubis, with which it is connected by loose connective tissue. When distended, the bladder rises, and its anterior surface comes in contact with the recti muscles of the abdomen. The posterior surface is covered by the peritoneum, which is reflected upon it from the rectum in the male, and from the uterus and vagina in the female. The lateral and superior regions are partially covered by the peritoneum. The inferior region, or bas-fond, is the most important in a surgical point of view. It is bounded before by the prostate gland, and behind by the peritoneum. Attached to it in the male we find the *vesiculæ seminales* and the *vasa deferentia*, which converge to the prostate gland, leaving a triangular space, where the bladder is only separated from the rectum by a quantity of fatty connective tissue surrounding numerous small vessels, chiefly veins. In the female this region rests on the vagina, which separates it from the rectum. The anterior and inferior regions of the bladder being left uncovered by folds of the peritoneum, the surgeon is able to perform operations on those parts without injuring that membrane, which is so liable to dangerous inflammation from wounds.—The walls of the bladder are composed of three layers or coats, united by connective tissue: an internal or mucous membrane, a middle or muscular coat, and an external or serous coat, formed by folds of the peritoneum. The muscular coat is composed of pale fibres interlacing in all directions, and enabling the bladder to contract so perfectly as to expel every drop of its contents. The neck of the bladder differs in structure from the rest of the organ, being composed of a somewhat fibrous whitish substance, and forming a connecting medium between the bladder and the urethra. Its posterior part rests upon the rectum; its anterior is surrounded below and at the sides by the prostate gland, which is peculiar to the male. This gland is composed of an aggregation of mucous follicles, forming three lobes, one on each side of the neck of the bladder, and one below, communicating by means of small ducts with the urethra. The inner coat or lining of the bladder, being a portion of the genito-urinary mucous membrane, not only lines the bladder, but is prolonged upward through the ureters into the kidneys, and downward along the urethra. It is of a pale rose color, with a smooth surface when the bladder is distended, and corrugated when empty. This membrane secretes a viscid fluid termed mucus, which protects it from the acrimony of the urine with which it would otherwise be in contact.—The secretion of the urine is performed by the kidneys, which are constantly active, without any apparent

alternation of action and repose, although within a given period they do more work at one time than another. The urine thus secreted dribbles incessantly along the ureters, and drops into the bladder, where it accumulates until the walls are distended, and a general uneasy sensation is produced which calls for an evacuation of the contents.—Congenital malformations of the bladder are not unfrequent. Sometimes it is altogether wanting; and in such cases the ureters empty into the rectum, as into the cloaca of birds, or at the pubes, or directly into the urethra. A still more frequent malformation is that in which, the lower portions of the recti muscles being imperfect, and the anterior wall of the bladder deficient, the posterior wall is protruded and forms a red fungus-like tumor above the pubes. The tumor presents two orifices, which are the mouths of the ureters, from which the urine constantly dribbles. Blasius describes a case in which the bladder was double. Molinetti, it is said, found in a female subject five kidneys, five ureters, and five bladders.—Inflammation may affect the coats of the bladder singly or together. When the mucous membrane is inflamed, there is a sense of irritation and a constant desire to discharge the contents. Ulcers, gangrenous spots, and indurations of various kinds may be produced by inflammation. The secretion of the mucous membrane may be increased or altered, constituting what is termed catarrh of the bladder. The mucous membrane is sometimes found in a varicose state. In other cases it gives origin to cysts of different kinds, and fungous growths; the latter occur mostly in old people. Various accidents and diseases may prevent the bladder from evacuating its contents, in which case it becomes excessively distended, and unless relieved inflammation ensues, a portion mortifies, through which the urine escapes into the abdomen, and speedy death is the result. After three days' retention the bladder usually attains its utmost limits of distention, and if not relieved the contents are evacuated in small quantities, as they would be in a case of mere incontinence of urine; and it is of great importance therefore not to mistake retention for incontinence where there is this point of similarity in their respective symptoms. When there is danger in delay, and a catheter cannot be introduced, the bladder may be punctured, either through the perineum or the rectum, or above the pubes, as it is not covered by the peritoneum in these regions.—Where urinary calculi exist in the bladder, they are removed by surgical operations. When small, they may be extracted through the urethra by a pair of forceps invented for the purpose; when large, they may sometimes be reduced into small pieces, minute enough to pass away with the urine; and where this is not practicable, they may be removed by cutting into the bladder.—In the whole class of birds there are no urinary bladders; the ureters descend from the kidneys and open into the cloaca, a musculo-membranous bag, which takes the place of the rectum, the uterus, and the bladder of the higher animals, and serves as a reservoir for solid excrement, for urine, and for eggs. In these animals the urine dilutes the fæces and forms the carbonate of lime or hard substance of the shell. The urinary bladder exists in several genera and species of fishes.

BLADEN, a S. E. county of North Carolina, bounded N. E. by South river, and intersected by the Cape Fear; area, about 800 sq. m.; pop. in 1870, 12,831, of whom 6,102 were colored. The surface is generally level, and diversified by a number of small lakes. Much of the land is occupied by extensive pine forests. The chief productions in 1870 were 86,986 bushels of Indian corn, 68,123 of sweet potatoes, 146 bales of cotton, and 38,187 lbs. of rice. There were 478 horses, 2,380 milch cows, 4,700 other cattle, 4,398 sheep, and 11,526 swine. Capital, Elizabethtown.

BLADENSBURG, a town of Prince George's county, Maryland, on the east branch of the Potomac, about 6 m. N. E. of Washington; pop. in 1870, 410. At the bridge over the Potomac W. of Bladensburg, the battle with the English preceding the capture of Washington by Cockburn and Ross took place, Aug. 24, 1814.

BLAGOVIESHTCHENSK, a town of Asiatic Russia, capital of the province of the Amoor, situated on the Amoor and the Dzega, not far from the Chinese town of Aigoon; pop. 3,107. It was founded in 1858.

BLAINE, Ephraim, an American soldier, born in 1741, died at Carlisle, Penn., in March, 1804. He entered the army as a colonel at the commencement of the revolutionary war, and was subsequently made commissary general. He was with Washington in many of the most trying scenes of the revolution, and enjoyed his entire confidence. During the "dark winter" at Valley Forge the preservation of the American army from starvation was in a great degree owing to the exertions of Col. Blaine.—His grandson, JAMES GILLESPIE, born in Washington county, Penn., Jan. 31, 1830, was for some time a teacher at the south, afterward a journalist at Portland, Me., and a member of the Maine legislature (1857–'62), and two years speaker of the house. He was elected to congress in 1862, has been reëlected five times (1872), and in 1871 was chosen speaker of the house of representatives.

BLAINVILLE, Henri Marie Ducrotay de, a French naturalist, born at Arques, near Dieppe in Normandy, Sept. 12, 1777, died in Paris, May 1, 1850. In 1794 or 1795 he entered the school of design at Rouen, and in 1796 entered as a pupil the studio of Vincent, the historical painter. He soon began to frequent the lectures on natural history at the jardin des plantes and at the collége de France, became one of the most diligent disciples of Cuvier, and finally devoted all his time to the study of human anatomy, obtaining the degree of M. D. in

1808. During some years, in concert with the German naturalist Oppel, he gave great attention to the study of reptiles and to myology. He also became an assistant to Cuvier. He was appointed to the chair of anatomy and zoölogy in the faculty of sciences in 1812, when he produced his celebrated thesis on the ornithorhynchus. In 1825 De Blainville was elected successor to Lacépède as a member of the academy of sciences. At the death of Lamarck, Dec. 18, 1829, the chair of natural history at the jardin des plantes was divided into several professorships, and De Blainville was appointed to the department of mollusca, zoöphytes, and worms; and in 1832 he succeeded Cuvier in the chair of comparative anatomy. He continued the work of Cuvier on the fossils of extinct species; but while the latter had only consulted the skeletons of living species as a means of comparison with fossil species, De Blainville attempted to treat the osteology of all types of organism, living as well as extinct, under the title of *Ostéographie, ou description iconographique comparée du squelette et du système dentaire des cinq classes d'animaux vertébrés récents et fossiles.* He died, however, before the completion of the work. In his *Prodrome d'une nouvelle distribution méthodique du règne animal* (Paris, 1816), he pointed out several modifications in the classification of animals which have since been generally accepted. In his *Dictionnaire d'histoire naturelle* he published a remarkable treatise on worms, which marks an epoch in the progress of that branch of science. He also published a work entitled *Faune française* (Paris, 1821, 1830), *Manuel de malacologie et de conchyliologie* (Strasburg, 1825–'7), *Cours de physiologie générale et comparée, professé à la faculté des sciences de Paris* (1833), and *Histoire des sciences naturelles au moyen âge* (Paris, 1845). In the classification of animals De Blainville was of opinion that the external form should be the leading characteristic in forming groups and families of allied species; while other naturalists maintain that the internal structure is of more importance in pointing out affinities and similarities.

BLAIR, a S. central county of Pennsylvania, drained by Clover creek, the Little Juniata, and one of its branches; area, 650 sq. m.; pop. in 1870, 38,051. The surface is very rugged, and nearly half of the land is unfit for cultivation. The Alleghany mountains form the western boundary; Dunning's and Brush mountains traverse the interior; and in the eastern part of the county rises Tussey's mountain. Between these ridges lie fertile and highly cultivated valleys. Bituminous coal and iron are found. The Pennsylvania Central railroad and branches and the Pennsylvania canal traverse the county. The chief productions in 1870 were 259,619 bushels of wheat, 64,839 of rye, 339,922 of Indian corn, 266,348 of oats, 20,677 tons of hay, and 294,879 lbs. of butter. There were 4,322 horses, 4,242 milch cows, 6,006 other cattle, 8,372 sheep, and 6,781 swine. Capital, Hollidaysburg.

BLAIR. I. Francis Preston, an American journalist, born at Abingdon, Washington county, Va., April 12, 1791. He was educated at Transylvania university, Kentucky, and studied law, but never practised. He early took part in politics, and in 1824 supported Henry Clay for the presidency, but dissented from his views, especially in relation to the United States bank. When in 1829 the nullification movement was developed in South Carolina, Mr. Blair published an article against it in a Kentucky newspaper, which attracted the attention of Gen. Jackson, who invited the writer to become the editor of the "Globe," a democratic journal about to be established in Washington. The journal was commenced in November, 1830, and became the organ of the successive democratic administrations, Mr. Blair retaining the control of it till 1845, when President Polk thought it necessary for the harmony of the party that the organ should be placed in other hands, offering Mr. Blair the position of minister to Spain, which was declined. He then retired to his estate of Silver Springs, Montgomery county, Md. In 1848 he withdrew from the regular democratic party, and supported Mr. Van Buren for the presidency. After the repeal of the Missouri compromise he took an active part in the organization of the republican party. **II. Montgomery,** son of the preceding, born in Franklin county, Ky., May 10, 1813. He was educated at West Point, graduating in 1835, and served in the Seminole war. In 1836 he resigned his commission in the army, and entered upon the practice of law in St. Louis; was appointed United States district attorney for Missouri in 1839; and from 1843 to 1849 was a judge of the court of common pleas. In 1852 he removed to Maryland, and in 1855 was appointed solicitor of the United States in the court of claims. Previous to the repeal of the Missouri compromise he had been a democrat; afterward he became a member of the republican party, and was in consequence removed from his office by President Buchanan in 1858. In 1857 he acted as counsel for the plaintiff in the Dred Scott case. In 1860 he presided over the republican convention of Maryland, and in 1861 was appointed by President Lincoln postmaster general, which post he held till 1864. Since that time he has acted with the opponents of the republican party. **III. Francis Preston,** jr., brother of the preceding, born at Lexington, Ky., Feb. 19, 1821. He graduated at the college of New Jersey in 1841, and began the practice of law in St. Louis. In 1845, his health having become impaired, he made a journey to the Rocky mountains in company with a party of trappers. Being in New Mexico when hostilities with Mexico broke out, he entered the army as a private and served till 1847, when he returned to St. Louis and resumed his profession. In 1848

he attached himself to the free-soil branch of the democratic party, supporting Mr. Van Buren for the presidency, publicly opposed the extension of slavery into the territories, and for a time was editor of the "Missouri Democrat." In 1852, and again in 1854, he was elected to the legislature of Missouri. In 1856 he was elected a member of congress as a republican, and made a speech in favor of colonizing the colored population of the United States in Central America. At the next congressional election his democratic opponent was returned, and Mr. Blair contested the seat. He was again elected to congress in 1860 and 1862. He entered the army as colonel of volunteers in 1861, and was appointed brigadier general Aug. 7 and major general Nov. 29, 1862, resigning his seat in congress in 1863. He commanded a division during the Vicksburg campaign, and in 1864–'5 the 17th corps in the army of the Tennessee in Sherman's campaigns from Chattanooga to Atlanta, in the march to the sea, and in the Carolinas. In 1866 he was appointed collector of customs at St. Louis, and commissioner of the Pacific railroad. Becoming dissatisfied with the policy of the administration, he returned to the democratic party, and in 1868 was its candidate for the office of vice president. In 1870 he was chosen United States senator from Missouri to fill a vacancy, his term expiring March 4, 1873.

BLAIR, Hugh, a Scottish divine and author, born in Edinburgh, April 7, 1718, died there, Dec. 27, 1800. In 1759 he delivered a course of lectures on rhetoric and belles-lettres, which were so well received that the king was induced to establish a professorship of rhetoric and polite literature at the university of Edinburgh, and to appoint Dr. Blair its first professor. In 1763 he published a dissertation on the authenticity of Macpherson's "Ossian," and in 1777 the first volume of his sermons, subsequently followed by four others. In 1783 his lectures were published in 3 vols. 8vo.

BLAIR, James, D. D., an American clergyman and teacher, born in Scotland in 1656, died in Virginia, Aug. 8, 1743. He was educated in one of the Scottish universities, took orders in the Episcopal church in Scotland, removed to England in the latter part of the reign of Charles II., and in 1685 was sent by Dr. Compton, bishop of London, as missionary to Virginia. In 1689 he was appointed ecclesiastical commissary, the highest ecclesiastical officer in the province. Here he devoted his energies to the founding of a college, and having obtained the approval of the colonial government crossed the ocean to ask for help in England and secure a charter. This was granted in 1692, and Dr. Blair was made first president of William and Mary college. Through his energy the new institution survived various trials and discouragements, especially the destruction by fire of the college building in 1705. He was for some time president of the council of the colony and rector of Williamsburg. In 1722 he published "Our Saviour's Divine Sermon on the Mount explained and recommended in divers Sermons and Discourses" (4 vols. 8vo). These discourses were afterward republished with a commendatory preface by Dr. Waterland (1740).

BLAIR, John, a Scottish chronologist and geographer, born in Edinburgh, died June 24, 1782. He early removed to London, and in 1754 published his "Chronological History of the World, from the Creation to A. D. 1753." He received several ecclesiastical preferments, was appointed in 1757 chaplain to the princess dowager of Wales, and in 1763 was selected to accompany the duke of York on a tour to the continent.

BLAIR, Robert, a Scottish poet, born in Edinburgh in 1699, died Feb. 4, 1746. He was minister of Athelstaneford, East Lothian, from 1731 till his death. His poem of "The Grave," in blank verse, which appeared after his death (London, 1747), was highly praised by Campbell.

BLAIRSVILLE, a post borough of Indiana county, Penn., situated on the Conemaugh river and Pennsylvania canal, 36 m. E. of Pittsburgh, and about 3 m. from the Central railroad, with which it is connected by a branch; pop. in 1870, 1,054. It is the shipping point of nearly all the grain, pork, lumber, and coal exported from the county. There is a handsome bridge across the Conemaugh, with a single arch of 295 ft.

BLAKE, George Smith, an American naval officer, born in Worcester, Mass., in 1803, died at Longwood, Mass., June 24, 1871. He entered the navy as a midshipman in 1818, became lieutenant in 1827, and in 1846 obtained command of the 10-gun brig Perry, which was wrecked in a hurricane upon the coast of Florida. In 1847 he was promoted to commander, in which grade he was attached for some time to the bureau of construction and equipment. He also served as fleet captain and commander of the razee Independence in the Mediterranean for three years. In 1855 he was promoted to captain, and in 1857 was ordered as superintendent of the United States naval academy, which position he held during the civil war, the academy being removed from Annapolis, Md., to Newport, R. I. On the reorganization of the navy in July, 1862, Capt. Blake was promoted to commodore; and in 1866–'9 he was lighthouse inspector.

BLAKE, John Lauris, D. D., an American author and clergyman, born at Northwood, N. H., Dec. 21, 1788, died at Orange, N. J., July 6, 1857. He was educated at Brown university, graduating in 1812, and in 1813 he was licensed by the Rhode Island association of Congregational ministers, but soon after joined the Episcopal church, and organized the parish of St. Paul's at Pawtucket. In 1820 he returned to New Hampshire, and, taking temporary supervision of the churches in Concord and Hopkinton, established at the former place a young ladies' seminary, which in 1822 he removed to Boston. He continued in this school

till 1830, having charge also of St. Matthew's church in Boston most of the time. Subsequently, he was editor for a time of the "Literary Advertiser" and the "Gospel Advocate." In 1814 he published a "Text Book of Geography and Chronology," which passed through several editions. In 1835 appeared his "Biographical Dictionary," of which a second edition was published in 1856 (1 vol. large 8vo). He was the writer or compiler of nearly 50 different works, of which the greater part were text books for schools. There were also two or three volumes on rural economy, the "Family Cyclopædia," "Letters on Confirmation," a volume on prayer, sermons and addresses, &c.

BLAKE, Robert, an English admiral, born at Bridgewater, Somersetshire, in August, 1599, died off Plymouth, Aug. 17, 1657. He was the eldest son of a wealthy merchant, and was educated at Oxford. Although attached to the principles of the Puritans and theoretically a republican, he took no active part in politics, but in 1640 was returned to parliament for Bridgewater. Upon the outbreak of the civil war he raised forces in Somersetshire, and operated against the royalists in the western counties. In 1643 he commanded a fort at Bristol during the siege of that city, and having been appointed governor of Taunton, distinguished himself by his successful defence of that place in 1645 against a superior force. In 1649, after the execution of the king, the navy under Prince Rupert, which had continued loyal, had full control of the seas. At this juncture Blake was appointed to the command of a squadron, with the title of "general of the sea," and blockaded Prince Rupert in the harbor of Kinsale for several months. The prince, having broken through the blockading line with a loss of three ships, proceeded to the Tagus, whither he was soon followed by Blake, who by seizing a large number of richly laden Portuguese ships compelled the king of Portugal, who favored Rupert, to expel him. The two squadrons met off Malaga in January, 1651, when the royal fleet, except two ships, was destroyed. Upon returning home Blake received the thanks of parliament for these exploits, and was made warden of the Cinque Ports. He subsequently took Jersey, Guernsey, and the Scilly islands from the royalists, again received the thanks of parliament, and was elected a member of the council of state. In March, 1652, in anticipation of a war with Holland, Blake was appointed sole admiral, and on May 19, 1652, fought a battle in Dover roads with the Dutch fleet under Admiral Van Tromp, which was terminated only by night, when the Dutch withdrew, with the loss of two ships and 30 guns. He again met the enemy under De Witt on Sept. 28, and captured the Dutch flag ship and three others. Subsequently Blake divided his fleet into several squadrons, retaining himself only 37 ships, and was attacked near the Goodwin Sands, Nov. 29, by Van Tromp, at the head of twice that number. The battle, during which Blake was wounded, was stubbornly contested, and at night the English, having destroyed one of the enemy's ships and disabled two others, and lost six of their own, retired to the Thames. This success so elated Van Tromp that he sailed through the channel with brooms at his mast-heads. The English immediately strengthened their fleet, and embarked two regiments of infantry as marines; and in February, 1653, Blake put to sea with over 70 vessels. On the 18th he intercepted Van Tromp, with 76 ships of war, convoying a fleet of 300 merchantmen, off Portland island, and immediately attacked him. A running fight was maintained for three days, when the Dutch found refuge in the shallow water of their own coast, having lost 11 ships of war, with 2,000 men killed and 1,500 prisoners, besides 50 of their merchantmen. Blake lost but one ship; his slain were about 2,000. When Cromwell dissolved the long parliament and assumed absolute control of the government, Blake gave his support to the protector, and kept his men firm in their duty to the *de facto* government, saying to his officers, "It is not our business to mind state affairs, but to keep foreigners from fooling us." He sat in the first two parliaments summoned by Cromwell. On June 3 and 4, 1653, he fought again with the Dutch, driving them, with the loss of 20 ships, to their own shore. After this Blake was obliged by ill health to leave the sea, and was not present at the battle (end of July) which closed the war. In November, 1654, he was sent to the Mediterranean, at the head of a strong fleet, to exact reparation for injuries done to British commerce during the civil war. So great was his reputation that the duke of Tuscany and the knights of Malta at once made compensation, and Algiers and Tripoli submitted to his terms. Tunis, which resisted, was compelled to conclude a peace, Upon the breaking out of war with Spain in 1656, he was sent to blockade the bay of Cadiz, and on April 20, 1657, he cut out from under the guns of Santa Cruz, in the island of Teneriffe, a fleet of Spanish galleons laden with silver, defended by a strong naval force. This was perhaps the greatest of his achievements. He died of scurvy while entering Plymouth sound on his return. The career of Blake was remarkable. Without experience in war, he distinguished himself as a commander; without training at sea, he became at once the foremost admiral of his time. As a man he was of a blunt and fearless temper, and distinguished for straightforwardness and honesty of character.

BLAKE, William, an English artist and poet, born in London, Nov. 28, 1757, died there, Aug. 12, 1827. He was the son of a hosier, and at the age of 14 was apprenticed to an engraver, and when 21 began to make engravings for the booksellers. He also succeeded now and then in finding a purchaser for a drawing. He had

written poems from childhood, and in 1781 published a little volume of 70 pages, which was with a single exception the only book of his ever printed regularly during his lifetime; it met with no success. At 25 he married Catharine Boucher. Though she could not read nor write at the time of her marriage, she had grace and talent, and was able to enter into the tastes and fancies of her husband, and in time became a skilful artist. Their union, which lasted 45 years, though childless, was one of unusual happiness. In 1788, having conceived the idea of printing and illustrating his own poems, he invented, or as he believed was spiritually taught, the way to do this. Upon a plate of copper the words and designs were drawn with varnish, and the parts not thus protected were eaten away with an acid, leaving the letters and lines in relief, as in a stereotyped page. Impressions were taken from this, at first by rubbing, afterward by a common printing press. For ink he used the common colors of the shops, which he ground fine and mixed with diluted glue. The ink was applied to the block by means of a brush, as has always been done by the Chinese. The words were usually printed in red, the design and ornaments in the color which he wished to form the tone of the picture, blue, green, or yellow, usually a mellow brown. The pictures were sometimes sold in that shape, and sometimes tinted like the original drawings. His wife worked off the impressions, aided her husband in tinting them, and bound the sets in thin volumes. A part of the process, which was kept a secret, was, he believed, revealed to him by his deceased brother, the remainder by Joseph of Nazareth. The production of these illustrated poems was for 40 years Blake's chief source of income, although he painted many pictures (those now extant, with his drawings, numbering not less than 500) and executed almost innumerable engravings. The first series was "The Songs of Innocence," containing 27 pages about 7 inches by 5. The price of a tinted set was 20 guineas; the few perfect copies now extant are of priceless value. The "Inventions for the Book of Job," somewhat larger, executed toward the close of his life, are as a whole the most striking and characteristic of his works. Among others are the "Books of Prophecies," "Gates of Paradise," "Urizen," and "Visions of the Daughters of Albion and America," the words and illustrations being alike mystical and obscure, though marked with great vigor. His income was always small; but the common assertion that for the greater part of his life he lived in a garret and upon crusts of bread is without foundation. He spent all his life, excepting four years, in London, where he always had comfortable apartments in a respectable street; was decently dressed, and rather fond of the delicacies of the table, which his wife, who was an excellent cook, was able to produce within the limits of their means. He was never in debt; and when he died, although he left little money, his pictures and illustrated poems, sold from time to time, brought enough to maintain his widow in comfort during the four years that she survived him. Though little appreciated during his life, and almost forgotten for a generation after his death, it is now agreed that in force and originality England has not produced his superior. Some of his poems, although faulty in rhyme and rhythm, are exceedingly tender and graceful; others are so weird and mystical as apparently to justify the belief of his contemporaries that he was half mad. He had visions from childhood to old age, and whatever he imagined was to him as real as though it actually existed. He was thus familiar with primeval Egypt and Assyria, where he saw statues of which the noblest specimens of Greek art were only feeble copies. He could call up almost at will the shades of the dead, and from them draw portraits as if they were before him in the flesh. Many of these portraits remain. Some are strikingly characteristic of the personages; others, like "The Man who built the Pyramids" and "The Ghost of a Flea," are grotesque; and others, like "Nebuchadnezzar Eating Grass," are almost terrible. Yet he possessed, rather than was possessed by, his visions. He knew that their reality was different from that of the actual world. "Where did you see that?" some one inquired respecting one of his visions, which he had been describing as a matter of fact. "Here," was the reply, touching his forehead. He wrote, "I assert for myself that I do not behold the outward creation, and that it is hindrance, not action. 'What!' it will be questioned, 'when the sun rises, do you not see a round disk of fire somewhat like a guinea?' Oh! no, no! I see an innumerable company of the heavenly host crying, 'Holy, holy, holy is the Lord God Almighty.' I question not my corporeal eye any more than I would question a window concerning a sight. I look through it, and not with it." Blake retained his faculties to the last. Just before his death he lay softly singing. His wife stopped to listen. Looking upon her, now a faded woman of almost 70 years, he said affectionately, "My beloved, they are not mine; no, they are not mine." These seem to have been his last words. The popular life of Blake by Allan Cunningham, in his "British Painters and Sculptors," is often inaccurate. The life by Alexander Gilchrist (2 vols., London, 1863) contains nearly all of his poems, and exact facsimiles of many of his works, but without the coloring. Flaxman said of him, "The time will come when the finest of Blake's designs will be as much sought for and treasured up as those of Michel Angelo."

BLAKELY, Johnston, an officer of the United States navy, born in Ireland in October, 1781, lost at sea in 1814. His parents settled in North Carolina while he was very young. He was educated in the university of that state, entered the navy in 1800, and in 1813

commanded as lieutenant the brig Enterprise, cruising upon the eastern coast. In the same year he was promoted to the rank of master commandant and appointed to the new sloop Wasp, in which he sailed from Portsmouth, N. H., on a cruise, May 1, 1814. On June 28, in lat. 48° 36′ N., lon. 11° 15′ W., he fell in with and captured, after a severe engagement, the British sloop Reindeer. The danger of recapture being great, Capt. Blakely destroyed his prize and put into Lorient with his prisoners. For this exploit congress voted him a gold medal. The Wasp sailed from Lorient Aug. 27 on another cruise, and made several captures, one a vessel laden with guns and military stores, which was cut out of a convoy in charge of a line-of-battle ship. On the evening of Sept. 1 he captured the Avon, and subsequently took several other prizes and destroyed them. On Sept. 21 he captured the brig Atalanta and sent her to Savannah with a prize crew. On Oct. 9 the Wasp was spoken by a Swedish brig, but was never heard from again.

BLAKEY, Robert, an English metaphysician and author, born at Morpeth, Northumberland, in 1795. He published in 1829 "The Freedom of the Divine and Human Wills," and his reputation was increased in 1833 by his "History of Moral Science," which has been adopted as a text book in several American colleges. In 1834 he published an "Essay on Logic," and in 1835 was appointed professor of logic and metaphysics in Queen's college, Belfast; but the state of his health disabled him from teaching. His chief work is a "History of the Philosophy of Mind" (4 vols., 1848; new ed., 1850). The degree of Ph. D. was conferred on him by the university of Jena. Among his other works are "Lives of the Primitive Fathers" (1842), "Temporal Benefits of Christianity" (1849), "Historical Sketch of Logic" (1851), and "History of Political Literature" (3 vols., 1855 *et seq.*). He has also published several volumes on angling and sporting topics.

BLANC. I. Jean Joseph Louis, a French political and historical writer, born in Madrid, where his father was inspector general of finance under Joseph Bonaparte, Oct. 28, 1813. His mother was a Corsican, and the sister of the celebrated Pozzo di Borgo. He was educated for the diplomatic service; but his father lost his fortune in the revolution of 1830, and in 1832 the son became tutor to a private family at Arras. Removing to Paris in 1834, he became editor of the *Bon Sens*, a periodical of considerable influence. He left it in 1838, and established *La Revue du Progrès*, to promote the combination of the democratic associations, and to further the cause of political reform. A treatise on the "Organization of Labor," first published in this journal, appeared separately in 1840, and gave him a position as one of the ablest writers of the socialistic school. He maintained that industry ought to be conducted not for individual profit, but for the benefit of the community, each person contributing to the common stock according to his capabilities, and receiving from it according to his wants, under the supervision of the government. This work was followed soon after by his *Histoire de dix ans*, in which the political incidents of the period from 1830 to 1840 were described with remarkable animation and sagacity, and the policy of Louis Philippe and the ministers of the *bourgeoisie* was criticised with scathing partisan logic. The first two volumes of his equally brilliant *Histoire de la révolution française* (completed in 12 vols. in 1862) appeared shortly before the outbreak of the revolution of February, 1848, in bringing about which the works of Louis Blanc were probably more influential than those of any democratic writer of the epoch. He became a member of the provisional government, and procured the adoption of a decree abolishing capital punishment for political offences. He also contended for the creation of a ministry of progress, and, not being able to carry that measure, withdrew from the government, but at the request of his colleagues took back his resignation, and became the president of a commission to consider the labor question, which held its sittings at the Luxembourg palace, but accomplished nothing. He was accused of being implicated in the insurrectionary movements of May and June, and on the night of Aug. 25 his prosecution was authorized by the constituent assembly, of which he had been elected a member. He escaped to England, where he remained in voluntary exile until the downfall of Napoleon III. He then returned to France, was chosen a member of the national assembly (1871), and acted with the radical party, though he held himself aloof from the commune. Among his publications written in exile are *Pages d'histoire de la révolution de Février* (1850), *Révélations historiques* (1859), and *Histoire de la révolution de* 1848 (2 vols., 1870), all chiefly devoted to the defence of his own course in the February revolution, and *Lettres sur l'Angleterre* (2 vols., 1866). In 1849–'51 he also edited and almost entirely wrote the *Nouveau Monde*, a monthly journal (Paris). **II. Auguste Alexandre Charles,** brother of the preceding, born at Castres, Nov. 17, 1815. He obtained distinction as an engraver and art critic, and was at the head of the department of fine arts in the ministry of the interior from 1848 to 1852. In 1845 he published the first volume of *L'Histoire des peintres français au XIX. siècle*, which has never been finished. With the assistance of eminent writers he has continued the publication of Armengaud's illustrated *Histoire des peintres de toutes les écoles* (1849–'69), and is the sole author of its biographies of French and Dutch painters. His other works include *Les peintres des fêtes galantes* (1853); *Le trésor de la curiosité* (2 vols., 1857–'8); *L'œuvre complet de Rembrandt* (2 vols., 1859–'63); and *Grammaire des arts du dessin* (1867). He became editor-in-chief of the *Gazette des Beaux Arts*, founded in 1859,

succeeded Count Walewski in 1868 as a member of the academy of fine arts, and in 1869 delivered lectures in Switzerland.

BLANC, Le, a town of France, department of Indre, on the river Creuse, 33 m. S. W. of Châteauroux; pop. in 1866, 5,822. It contains some cloth manufactories and bleaching works. It was formerly strongly fortified, having a wall flanked by towers and three forts, of which only vestiges remain. There is a handsome church of the 12th century, dedicated to St. Génitour.

BLANC, Mont. See MONT BLANC.

BLANCHARD, Émile, a French naturalist, born in Paris, March 6, 1820. He studied zoölogy, anatomy, physiology, and entomology, was early connected with the museum of natural history, and classified its entomological collection (2 vols., 1850–'51). Since 1862 he has been professor and curator of that institution. He succeeded Isidore Geoffroy-Saint-Hilaire as a member of the academy of sciences in 1861, and has contributed many valuable papers to its annals. His principal works include *Recherches sur l'organisation des vers* (Paris, 1837); *Histoire des insectes, traitant de leurs mœurs et de leurs métamorphoses en général*, &c. (2 vols., 1843–'5; English translation by Duncan, "Transformation of Insects," London, 1870); *La zoologie agricole* (4to, with illustrations, 1854 *et seq.*); and *Organisation du règne animal* (36 numbers, 4to, 1861–'4).

BLANCHARD, François, a French aëronaut, born at Andelys in 1738, died in Paris, March 7, 1809. In his youth he spent his time in trying to make flying machines, and after the invention of the balloon in 1783 became greatly interested in that contrivance. He constructed a balloon with wings and a rudder, in which he ascended in March, 1784. On Jan. 7, 1785, he crossed the British channel from Dover to Calais, for which Louis XVI. rewarded him with a gift of 12,000 francs and a life pension of 1,200 francs. He invented a parachute to break the fall in case of accident, and first used it in London in 1785. He went through various parts of Europe, and in 1796 made a visit to New York, displaying everywhere his aëronautic skill. In 1798 he ascended from Rouen with 16 persons in a large balloon, and descended at a place 15 miles distant. In 1808, while making his 66th ascent, at the Hague, he had an apoplectic stroke, from the effects of which he died in the succeeding year.—His wife, MARIE MADELEINE SOPHIE ARMANT, continued to make aërial voyages; but in June, 1819, having ascended from the Tivoli garden in Paris, her balloon, illuminated with fireworks, took fire at a considerable height, and she was dashed to pieces.

BLANCHARD, Henri Pierre Léon Pharamond, a French painter, born at Guillotière, Feb. 27, 1805. He studied under Chasselat and Gros, and subsequently made extended tours in Spain, northern Africa, Mexico, Germany, and Russia, the fruits of which have appeared in a series of pictures illustrating the habits, history, and natural features of those countries. He has also produced numerous designs for illustrated periodicals, and is the author of an illustrated and descriptive account of a journey from Paris to Constantinople.

BLANCHARD, Laman, an English writer, born at Great Yarmouth, May 15, 1803, died in London, Feb. 15, 1845. In 1831 he became acting editor of the "New Monthly Magazine," conducted by Bulwer, and from that time forward was a most prolific contributor to the periodical press. The insanity of his wife and the failure of his own health preyed upon his mind, and soon after his wife's death he committed suicide. He was highly esteemed by the many literary men with whom he associated. His "Essays and Sketches," collected from various periodicals, were published for the benefit of his orphans, in 3 volumes, with a biography by Lord Lytton.

BLANCHARD, Thomas, an American mechanic and inventor, born at Sutton, Worcester co., Mass., June 24, 1788, died in Boston, April 16, 1864. While engaged with his brother in making tacks by hand, he conceived the idea of inventing a machine for the purpose. He was then only 18 years old, and it was six years before the invention was perfected. Finally, so effective was the machine, that by placing in the hopper the iron to be worked, and applying the motive power, 500 tacks were made per minute, with better finish than had ever been attained before. Soon after completing this task he undertook to invent a machine for turning gun barrels throughout their entire length by one self-directing operation, and accomplished it with entire success. It not only cuts the cylindrical part of the barrel, but the flattened portion as well without the intervention of hand work. This was followed by the invention of a lathe for turning gun stocks and other irregular forms, which came into general use at once. Mr. Blanchard was also interested at an early day in the construction of railroads and locomotives, and of steamboats so contrived as to ascend rapids of considerable force. He invented a steam wagon before any railroad had ever been laid. He took out upward of 25 patents during his lifetime, from some of which he derived considerable profit. His last years he spent in Boston in the business of bending heavy timbers to any desired form by a process of his own invention.

BLANCHE, August, a Swedish poet, born in 1811, died in Stockholm, Nov. 30, 1868. He began life as a lawyer, and about 1846 devoted himself to literature, producing comedies, dramas, and novels, and editing the *Illustrerad Tidning*. He was a member of the Swedish diet, in which he was noted for eloquence and zeal for reform. A complete edition of his works was published in 1868.

BLANCHE OF BOURBON, queen of Castile, born in France about 1338, died in Spain in 1361. She was the daughter of the duke of Bourbon, and at the age of 15 was betrothed

to Pedro, king of Castile, afterward called the Cruel. The king consented to the espousal from political considerations, but all his affection was bestowed upon Maria de Padilla. His natural brother Don Federico having been sent to meet the princess at Narbonne, it was pretended that the two were engaged in an intrigue; and though the king married Blanche the next day, he did not conceal his repugnance, and speedily left her for the society of his mistress. She then accepted the protection of the king's brothers, who were causing some political disturbance in Castile. The king declared the marriage void and ordered her to be kept prisoner at the Alcazar of Toledo. She escaped from the guards in the city of Toledo, and taking refuge in the cathedral, aroused the sympathy of the people by her cries, her personal beauty, and her helpless condition. They attempted to protect her, but the city was taken by assault, and the queen was sent to the castle of Medina Sidonia, where she died of poison administered to her by order of Pedro. To avenge her wrongs was one of the principal incentives of the men who a few years later engaged in the war against Pedro, and her story formed the subject of many of the Spanish ballads of that and later ages.

BLANCHE OF CASTILE, queen of France, born about 1187, died Dec. 1, 1252. She was the daughter of Alfonso IX., king of Castile, by Eleonora of England, daughter of Henry II. By the treaty of peace concluded in 1200, between King John and Philip Augustus, it was agreed that Blanche should marry Louis, heir apparent to the crown of France, and the marriage took place in the beginning of the following year. In political affairs she gave evidence of ability. In 1216, when her husband was invited to accept the crown of England by the lords confederated against John, she insisted upon his acceding to their offer, and sent him money and reënforcements. The death of John, however, put an end to these attempts, and the lords returned to their allegiance under his son. On the death of Philip Augustus and the accession of her husband to the throne as Louis VIII., she was more than ever his inspiring genius. She accompanied him in his second crusade against the Albigenses, and on his death assumed the regency during the minority of their son Louis IX. A formidable league had been formed in the north of France, claiming the regency for young Philip Hurepel, a son of Philip Augustus by Agnes de Méranie. The queen opposed it most vigorously, and succeeded, after a struggle of nearly four years, in defeating the confederates. Meanwhile she had secured to the crown the rich inheritance of the counts of Toulouse, by a treaty signed at Paris in 1229; she then forced to submission the duke of Brittany, and helped her friend the count of Champagne in taking possession of the kingdom of Navarre. She superintended the operations of the army and government in person, and exhibited the highest degree of ability and promptness. In 1234 she married her son, then 19 years old, to Marguerite of Provence, who was but 12. When, in 1236, she resigned her power into the hands of Louis IX., the kingdom was in a flourishing condition, and had received many important territorial accessions. The young king retained her near him as his best adviser, but engaged in his crusade to the Holy Land in opposition to her wishes. After his departure she resumed the duties of regent, and displayed her wonted ability among the new difficulties which she had to encounter. She was forced continually to send money and forces to her son to aid in his ill-omened enterprise; and when he and his brothers were defeated and made prisoners in Egypt, she was obliged to raise a large ransom for their release. This necessitated heavy taxes, and the country was drained of its resources. In the midst of these difficulties Blanche had to meet the revolt of the *pastoureaux*, which she suppressed with a firm hand. Notwithstanding her embarrassments and her devoted piety, she withstood the encroachments of the ecclesiastical power with great spirit, and successfully defended the prerogatives of the crown. She was universally mourned at her death, and has always been regarded as one of the most remarkable rulers of France.

BLANCO, a S. central county of Texas, watered by the Pedernales and San Marcos rivers; area, 727 sq. m.; pop. in 1870, 1,187, of whom 44 were colored. The surface is chiefly prairie. The chief productions in 1870 were 1,391 bushels of wheat, 42,830 of Indian corn, 2,215 of sweet potatoes, 233 bales of cotton, and 6,178 lbs. of wool. There were 2,074 horses, 1,367 milch cows, 9,455 other cattle, 3,295 sheep, and 4,194 swine. Capital, Blanco.

BLAND, a S. W. county of Virginia, bordering on West Virginia; area, 330 sq. m.; pop. in 1870, 4,000, of whom 217 were colored. The surface is mountainous. The chief productions in 1870 were 16,518 bushels of wheat, 42,057 of Indian corn, 28,392 of oats, and 1,883 tons of hay. There were 952 horses, 1,105 milch cows, 1,851 other cattle, 3,853 sheep, and 2,987 swine. Capital, Mechanicsburg.

BLAND, Theodoric, an American patriot and soldier, born in Prince George county, Va., in 1742, died in New York, June 1, 1790. Through his grandmother, Jane Rolfé, he was fourth in descent from Pocahontas. He was educated for a physician at Edinburgh, and practised his profession in Virginia till the breaking out of the revolutionary war, when he enlisted in the contest and bore an active part throughout. He was one of a score of gentlemen who removed from Lord Dunmore's palace the arms and ammunition which that nobleman had abstracted from the public arsenal; and soon afterward he published a series of bitterly indignant letters against the governor, under the signature of "Cassius." He was made captain of the first troop of Virginia

cavalry, but when six companies were enrolled became lieutenant colonel, with which rank he joined the main army in 1777. With the exception of a single term in the senate of Virginia, he remained in military service to the end of the war, enjoying the high esteem and confidence of Washington, who frequently employed him in responsible affairs. Upon the termination of the struggle he was elected a member of the general congress, which then sat at Philadelphia, and continued a member till 1783. He was elected a member of the convention of 1788 to ratify the federal constitution, and voted against that instrument, but was chosen as the first representative to congress under it. He left valuable memorials of the revolutionary period, which were published in 1840 under the title of "The Bland Papers."

BLANDRATA, Giorgio, an Italian Unitarian, born in the marquisate of Saluzzo, Piedmont, about 1515, died in Transylvania about 1590. He at first practised medicine in Pavia, but having embraced anti-Trinitarian doctrines was compelled to leave Italy, and became physician to the wife of King Sigismund Augustus of Poland. Returning to Italy, he was thrown into prison, but escaped and took refuge at Geneva. Finding himself nearly as obnoxious to the Calvinists as to the Roman Catholics, he returned to Poland. There, although Calvin warned the people against him, he acquired great influence. Prince Radziwill sent him as plenipotentiary to the synod of Pinczów in 1561. Two years after this he accepted an invitation to become physician to John Sigismund, prince of Transylvania. Here he made many converts, including the prince and court; and at a diet held in 1571 at Maros-Vásárhely, Unitarianism was legally recognized as one of the religions of the land. After the death of John Sigismund he was physician to Stephen and Christopher Báthori, the rank of privy councillor being conferred upon him after Stephen's accession to the throne of Poland, in promoting which he was very active. Stephen was not favorable to his doctrines, and it is said that for the purpose of advancing his interests with the king he gave them up. At all events he succeeded in accumulating a large fortune, and his nephew strangled him in bed for the purpose of securing it. His collected works, in Latin, were published by Henke (Helmstädt, 1794).

BLANGINI, Giuseppe Marco Maria Felice, an Italian composer, born in Turin, Nov. 18, 1781, died in Paris in December, 1841. He displayed remarkable musical talent as a child, and his first compositions date from his 14th year. He went to Paris in 1799, and was for several years a successful composer of operas there. His fame, however, rests chiefly on his smaller pieces, which were received with much favor, especially in Germany, where he officiated for some time as chapelmaster at the court of the king of Westphalia. He returned to Paris in 1814, and received the honorary title of superintendent and composer of music to the king. His works include 17 operas.

BLANKENBURG. I. A circle in the duchy of Brunswick, Germany; area, 183 sq. m.; pop. about 23,000. The southern part, bordering on the Hartz mountains, is covered with forests, and contains valuable iron mines and marble quarries; the northern part is fertile and well cultivated. Until the 12th century the district was known as the Hartingau; and it was subject to the counts of Blankenburg till 1599, when it passed into the possession of Brunswick on the death of the last of the Blankenburg house. In 1690 it was ceded to Ludwig Rudolph of Wolfenbüttel, and in 1707 it was made a principality. After being an independent government till 1731, it again passed into the possession of Brunswick, and remained subject to that duchy. **II.** The principal town of the circle, situated among the Hartz mountains, 14 m. E. of the summit of the Brocken, on a small stream of the same name, and near the foot of a picturesque mountain called the Blankenstein; pop. in 1871, 3,928. Near by is the palace of Luisenburg, which contains 270 apartments and a large collection of paintings; and at the distance of 1½ m. are the ruins of the castle of Regenstein or Reinstein, hewn in part from solid rock. In 1625 the town was besieged by Wallenstein. During the seven years' war the court of Brunswick had its residence here, the place preserving a neutrality which was respected by all parties. Regenstein was taken by the French in 1757, but retaken by the Prussians during the next year. Louis XVIII. resided at Blankenburg from 1796 to 1798, as the count de Lille.

BLANKHOF, Jan Teunisz, called Jan Maat, a Dutch painter of marine pieces, born at Alkmaar in 1628, died in 1670. He was a pupil of Cæsar van Everdingen, and also studied in Rome. His pictures generally represent Italian ports and the coasts of the Mediterranean, and several of his storm scenes possess much merit.

BLANQUI. I. Jérôme Adolphe, a French political economist, born in Nice, Nov. 20, 1798, died in Paris, Jan. 28, 1854. His father, Jean Dominique, was a deputy to the national convention, one of the 73 members sent to prison on the fall of the Girondists (June 2, 1793), and afterward a member of the council of 500. The son was originally destined to the study of medicine, but having become acquainted with Jean Baptiste Say while pursuing his studies at Paris, he was induced to devote himself to political economy. He published a *Résumé* of the history of commerce and industry (1826), and this was soon followed by a *Précis élémentaire d'économie politique*, and several minor publications. In 1830 he was chosen professor in the special school of commerce, where his lectures on the history of commerce and industrial civilization attracted unusual attention. When Say retired from his professorship in the *conservatoire des*

arts et métiers, Blanqui succeeded to his place. In 1837–'42 he issued his most important work, *L'Histoire de l'économie politique en Europe depuis les anciens jusqu'à nos jours* (5 vols. 8vo). In 1846–'8 Blanqui was a member of the chamber of deputies from Bordeaux. At the industrial congress at Brussels in 1847, his discourses were remarked for their vivacity and learning. He visited various countries of Europe for the purpose of studying their condition, and embodied the results in his books; and in 1851 he furnished a complete account of the financial aspects of London for the academy of moral and political sciences, of which he was a member. **II. Louis Auguste,** a socialistic revolutionist and conspirator, brother of the preceding, born in Nice in 1805. In 1830, while a student of law, he took up arms against Charles X., and received the decoration of July. Under the government of Louis Philippe he kept up a constant warfare through the press on the existing state of things, and became one of the most active propagators of the doctrines which led to the revolution of 1848. In 1835 he was arrested, tried, and sentenced to one year's imprisonment and a fine of 200 francs. A few months later, being suspected of complicity with Fieschi, he was sent to prison for two years and fined 3,000 francs, but was amnestied before the expiration of his term. As soon as he was released, he renewed his onslaught upon monarchical government and formed an organization to carry his ideas into effect. In 1839, with Barbès and others, he attempted an insurrection, which was speedily checked, and he was condemned to death, but the sentence was commuted to perpetual imprisonment. He was released by the revolution of 1848, and immediately organized the revolutionary "Central Republican Society." He led in the attempt on May 15 to overthrow the constituent assembly, and was a few days later arrested and sentenced to ten years' imprisonment. He was released in 1859, but was sentenced again to four years' imprisonment in January, 1862. He appeared again as one of the active spirits in the violent agitations in favor of the red republic which culminated in the Paris commune in 1871, and was still in 1872 a prisoner of state.

BLARNEY, a village of Munster, Ireland, 4 m. N. W. of Cork, noted for its castle, built by Cormick McCarty in 1449. This stands on the N. side of a precipitous ridge of limestone rock, rising from a deep valley, and part of its base is washed by a small river called the Aw-Martin. Near it are the famous groves of Blarney. Of the original fortress there remains only a large, square, massive tower, with a parapet breast high; on the summit is the famous stone, which is said to confer on the person kissing it the peculiar property of saying anything, by way of coaxing, compliment, or praise, most agreeable to the hearer. From the virtue it thus communicates, the well known word blarney is derived. The actual Blarney stone is not the one commonly saluted as such, but is said to form part of the wall several

Blarney Castle, Cork.

feet below its representative, and can only be kissed by a person held over the parapet by the heels.

BLASPHEMY (Gr. *βλασφημία*), in law, has been judicially described (20 Pickering's Reports, 213) as "speaking evil of the Deity, with an impious purpose to derogate from the divine majesty, and to alienate the minds of others from the love and reverence of God. It is purposely using words concerning God calculated and designed to impair and destroy the reverence, respect, and confidence due to him as the intelligent creator, governor, and judge of the world. It embraces the idea of detraction when used toward the Supreme Being, as calumny usually carries the same idea when applied to an individual. It is a wilful and malicious attempt to lessen men's reverence of God, by denying his existence, or his attributes as an intelligent creator, governor, and judge of men, and to prevent their having confidence in him as such." The punishment by the Jewish law was death. Wherever Christianity is the prevailing religion of a country, whether established by law or not, blasphemy is so far noticed by the law that contumelious reproaches of Jesus Christ, profane and malicious scoffing at the Scriptures, and exposing any part thereof to contempt or ridicule, are regarded as blasphemy and punished accordingly. In England it is a felony at the common law, punishable by fine and imprisonment. In the early legislation of the American colonies death was denounced as the punishment for this offence, but fine or imprisonment, or both, are now substituted. It has sometimes been argued that the punishment of blasphemy by the state is inconsistent with the religious equality and freedom which are a part of the American constitutional law; but this doctrine has not obtained in the courts, which have

always held that one who maliciously makes use of language calculated to have an evil effect in sapping the foundations of society and of public order, may properly be punished as an offender against the state. But a fair discussion in a decorous manner of any controverted point or doctrine of religious belief stands on very different ground, and is innocent; the evil motive being essential to this offence. Profane swearing is a species of blasphemy, but more lightly punished.

BLASTING, the process of breaking rocks with explosive compounds. It is employed for breaking stone from quarries for building purposes, for removing rocks from the surface of the earth, from the beds of watercourses, and from mines, and for the demolition of fortifications, docks, and other works. It follows, therefore, that the process will vary considerably according to the object to be accomplished, and the differences in the material to be acted upon as to hardness, position, and mode of stratification. Until within a few years the only explosive compound used in blasting was gunpowder. It is not known when this agent was first used for this purpose, but as the Chinese were acquainted with its use as a projectile force in very early times, it is not improbable that they also used it in mining operations, which were carried on by them to a considerable extent long before the Christian era. In Europe the Germans were probably the first to employ it in mining.—In making preparations for blasting, the first step is to examine the rock for the purpose of determining the size, location, and form of the cavity for the explosive material, and the amount of the latter necessary to overcome the resistance. In ordinary blasting operations, simple drill holes are usually fired, and may be so placed and combined in groups as to effect the displacement of great masses of rock; but in large operations mines are excavated for the introduction of the explosive. In either case one of the principal operations is the boring or drilling of the rock. Drills of various forms are employed—short and light for working by hand, larger and longer when they are to be driven with a sledge. These drills are made by flattening the end of a steel bar, and drawing it to a blunt, outwardly curved edge, which should be from one eighth to one fourth of an inch longer than the diameter of the shaft. The included angle at the edge should be from 70° to 90°. This part of the drill is called the bit. Other drills, called jumpers, are made longer and of a different form, and are intended to be driven by the force of their own gravity. The jumper is made of a bar of steel or iron from 5 to 8 ft. long, with a bulbous enlargement rather nearer one end than the other. The bit, which is of steel, has usually the same form as in the hand drill, but sometimes has two cutting edges, formed at right angles with each other. In using the jumper from two to four men are employed, who simply raise it to the proper height and let it fall, giving it at the same time a sufficient rotary motion to cause it to cut a chip from a bench left by the preceding stroke. The hole is usually commenced with one end of the drill and finished with the other. Some drills which are propelled by their own weight are made very heavy and raised by steam power. Other drills, the most notable among which are the Burleigh, Ingersoll, Wood, Hotchkiss, and Gardner (see Boring), are mounted on carriages and driven by steam or compressed air, which is delivered by means of pipes and stout hose capable of sustaining a pressure of from 60 to 80 lbs. to the square inch. By the use of air in place of steam, the drill can be worked in chambers where the heat and moisture produced by the discharge of steam would be unendurable. Revolving tools worked on the principle of augers, with bits of various forms to suit the kind of work to be done, may be advantageously used in soft rock. The American diamond drill is a revolving tool which is driven by steam or compressed air. The bit is armed with black diamonds, which are so adjusted as to cut a free passage for the drill rod. It is much used in deep boring for artesian wells and for prospecting coal and other mines, but is said to be also well adapted to boring holes for blasting. —Natural fissures in the rock are often taken advantage of to introduce powder, which is covered with dry sand, a communication being retained by means of a fuse. This is called a sand blast. For breaking down the huge blocks of native copper in the mines of Lake Superior, no other known method but shaking them by the sand blast would be effectual. Standing upon their edges in the veins, and entirely enclosed in solid rock, they are first uncovered along one of their sides by excavating a horizontal drift or gallery. Small cavities are then made behind the mass, along its upper edge, by repeated blasts in the tangled rock and copper. As these cavities are enlarged, more powder is introduced, till, if the mass be very large, several hundred pounds are spread in the crevice behind it, and fired at once; and thus it is finally thrown over into the open space previously excavated.—As the great labor in blasting consists in drilling the holes, which after all contain but a small quantity of powder, various plans have been devised for enlarging the cavity at the bottom. In calcareous rock this has been effected by the use of acids, which dissolve the stone. For other rocks a very ingenious process was invented by Mr. A. Stickney, of Concord, N. H. After the hole (which should be not less than 3 in. in diameter) is bored to the depth of 5 or 6 ft., fragments of the best hard-wood charcoal are thrown into the bottom and ignited. A blast is then blown in from a portable bellows through a wrought-iron tube, to which is added at its lower extremity a tube of platinum not less than a foot in length and half an inch in diameter. The lower extremity of this

is closed, but its sides are perforated with numerous small holes. As the blast circulates through these the charcoal burns vividly, producing intense heat and melting away the sides of the cavity. The tubes must be frequently withdrawn to hook out the fragments of cinder which accumulate; and as the size of the chamber increases more charcoal is continually dropped into the hole by the side of the tubes, the hole being left open for the escape of the gases. In the course of a few hours the cavity will be sufficiently large to hold 20 or 30 lbs. of powder. In granitic rocks the effect of this operation is very remarkable; the ingredients melt down into a liquid slag, and if a bucket of cold water is dashed in upon the highly heated surface, this is scaled off in large flakes by the sudden chill, and by the mechanical action of the high steam which is instantly generated. In hard silicious rocks, as the firm sandstones of the Shawangunk range, the rock crumbles down to sand, and this is blown out of the hole as the process goes on, covering the surface around. In calcareous rocks the stone is burned to quicklime, and a large cavity is rapidly produced. The heat generated in this operation is so great, that wrought-iron pipes have been melted down by coming into too close a contact with the charcoal. The enlarged size of the hole at the bottom is particularly favorable for the explosive force of the powder to be exerted to the best advantage. Huge masses of rock are lifted up, and cracks of great extent are opened to a depth not reached by the ordinary method of blasting. These cracks afford convenient opportunities for the use of the sand blast, and thus very large quantities of rock are broken up with comparatively small expense for drilling.—Firing a number of charges simultaneously by the galvanic battery is sometimes adopted with great advantage, where large bodies are to be moved. The effect produced by the same quantity of powder is much greater than if the charges were separately exploded. The same mode of firing is also conveniently applied to blasting under water. This method has been said to have been first practised in England in 1839, by Gen. Pasley in removing the wreck of the Royal George, and by Mr. Alan Stevenson in submarine rock blasting. But in vol. xxi. of the "American Journal of Science," for 1831, is a letter of Dr. Hare, describing the operations of Mr. Moses Shaw, who had already applied the electrical machine to this purpose, and then by advice of Dr. Hare was making use of the galvanic battery; and in vol. xxvi. of the same journal (1834) the apparatus is fully described, with drawings which show that the arrangement was essentially the same with that now in use. In 1843 three charges of 18,000 lbs. of powder were fired simultaneously by this means at Dover, by Mr. William Cubitt. A chalk cliff 400 feet high was thrown down with little report, and the beach was covered with 400,000 cubic yards of chalk rock. It is estimated that the saving to the Southeastern railway company in this operation over the ordinary process was not less than £7,000. Very successful blasting was performed at the Holyhead quarries in England in January, 1867, for supplying stone for the breakwater at that place. The accompanying diagram (fig. 1) exhibits the ground plan of the galleries and return chambers. These latter were placed 3 ft. below the level of the ground line of the face of the quarry, because it had been found by experience that if they were placed above the level, a wall of rock would be left standing, expensive to remove. The method of estimating the total quantities of powder for loading the four chambers was as follows: The cubical content of the mass to be dislodged was divided

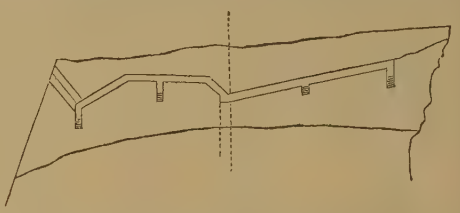


Fig. 1.—Original Face of Rock, 210 ft. long, 115 ft. high.

by 12, the minimum number of cubic feet per ton, and the quotient by 5, it being estimated in this case that one pound of powder was required to dislodge five tons of rock. The length of the face of the rock being 210 ft., its height 115 ft., and the horizontal depth to be removed 40 ft., the proper quantity of powder was therefore, in round numbers, 16,000 lbs. The quantities applicable to charges No. 1, 2, 3, and 4, the lines of least resistance being respectively 26, 25, 20, and 27 ft., were 4,200, 4,500, 2,300, and 5,000 lbs. That these estimates were very nearly correct appears from the fact that the force of the powder was mainly expended in displacing and breaking up the rock, but little concussion of air being produced. The report of Col. Servante of the royal engineers, who was sent to witness the explosion, says: "The mass was quietly overthrown down to the level of the quarry ground line, with very little noise, and scarcely a stone was thrown into the air." The quantity of rock detached was found to be 120,000 tons, in blocks of from 3 to 40 tons, averaging 7½ tons of stone to one pound of powder. The operations were conducted by Mr. C. G. Reitheimer, the engineer employed by the Messrs. Rigby, the proprietors of the quarry. The galleries and shaft were tamped with clay, and the tamping was extended through the entrance gallery to the surface of the rock. The description of the operations performed in the demolition of the Russian docks at Sebastopol by the English and French engineers, which is contained in vol. vi. of the "Professional Papers of the Corps of Royal Engineers" of Great Britain, presents interesting examples of blasting.—The choice of the explosive com-

pound depends upon the nature of the work to be performed. In quarrying, gunpowder of slow igniting power is preferred, because it is desired to avoid pulverization; but in simply clearing away material, a more instantaneous explosive is found to be more effectual. Gun-cotton was used in Europe to some extent soon after its discovery, but has never been employed in any important work in this country, except as an experiment. Nitro-glycerine, or some preparation of it, as giant powder, is the compound now relied upon when rapidity and an approach to accuracy of result are desired; and it is generally preferred when the disengaging of surface portions of rock is the immediate object. It often happens in some situations, especially in excavating chambers under water, where it is of the greatest importance to keep the water bed as firm and intact as possible, that a seamy structure of rock requires the use of an explosive which will expend its force as much as possible in detaching only a certain superficial mass, upon the same principle that a small hammer, propelled with a sharp quick stroke, is better adapted to drive a nail in an unstable and slight body than a heavy one. When gunpowder is used, the holes are usually drilled deeper than for nitro-glycerine, and when practicable the powder is poured into the cavity instead of being introduced in a cartridge. Therefore the holes are drilled in a downward direction, as nearly perpendicular as the course of lamination and other circumstances will admit. The small hand drill is held and driven by one person, and after each stroke it is turned sufficiently to allow of a chip being cut from a section of the bottom. The degree to which this turning is done at each stroke is a matter of consequence, as upon it depends much of the rapidity and economy of the operation. When the bottom of the cavity becomes obstructed, instruments called scrapers or dippers are used to clear it out. Some of these tools are merely wires bent at right angles at one end, which is flattened so as to form a shelf upon which the rubbish may be taken; but the flattened end should be slightly depressed on one side, so that by a twisting motion the shelf or pan may be made to pass under. A worm is often formed at the other end for carrying a piece of sponge or other material to the bottom of the cavity to absorb water. It is generally advantageous to pour water into the cavity while drilling for the purpose of softening the rock, and keeping the bit from heating. It often happens that water percolates into the cavity, and in either case some contrivance is required to occasionally remove it. When the hole has reached a sufficient depth it is to be thoroughly cleaned and dried with the scraper and a piece of sponge or cloth attached to a stick or to the worm at one end of the scraper. Then the proper charge of powder is poured in and covered with a tamping, which may consist of dry sand, brick dust, or moist clay. When dry sand is used, it is not tamped down, but brick dust or clay is, the material being introduced in small quantities at a time, and successively compacted with a tamping rod, which is simply a straight bar of copper, brass, or wood. The end of a fuse, which is made of gutta-percha cylinder, impervious to moisture, filled with a mixture of gunpowder, charcoal, and nitre, is passed into the hole and inserted in the body of the charge before the tamping material is introduced, the other end remaining outside and being of a sufficient length to burn the desired time before producing the explosion. When a fuse is not employed, a priming needle made of copper is passed down one side of the hole, with the point extending into the powder. It has a tapering form, so that its withdrawal will not disturb the tamping, which in this case must be more or less damp. When the needle is withdrawn the canal is filled with fine powder, and its ignition effected with a slow match. When the cavity, in consequence of percolation from surrounding rock, cannot be dried, the powder must be used in the form of a cartridge, the case of which is made of tin or pitched paper. When nitro-glycerine is used, it is placed in cartridges and exploded by means of some kind of fulminate, as fulminate of mercury or chlorate of potash, or both together. The fulminate may be ignited either by a fuse or by a galvanic battery. The use of nitro-glycerine in its raw state being considered very dangerous, preparations of it have been made, which with careful handling are no more hazardous than gunpowder. Of these, giant powder or dynamite, which is composed of 75 per cent. of nitro-glycerine with 25 per cent. of a certain silicious infusorial earth, holds the first rank. When an explosive compound is fired, the great and almost instantaneous expansion of liberated gases, which in the case of gunpowder is many hundred times its volume, produces an equal pressure in all directions. Those surfaces which offer the least resistance of course give way to the greatest extent; and the slower the explosion and consequent expansion, the more will these surfaces be displaced, receiving by direct action and reaction most of the explosive force, while the firmer material will be left undisturbed. When, however, nitro-glycerine is used, the expansion of gases is so nearly instantaneous, that the tampings, even when they are quite unstable, offer an amount of resistance which is considerable. Even when it is fired upon the surface of a rock under a depth of only a few feet of water, so great is the reaction produced by the inertia of the water that a sufficient force is exerted against the rock to rend it in some instances to a large extent. Under similar circumstances even gunpowder will explode with considerable effect. Mr. Maillefert in the years 1851 and 1852 succeeded, by the use of gunpowder in surface blasting under water, in removing large portions of several of the obstructions to the navigation of the East river at Hell Gate. Rocks known as Pot rock, the Fry-

ing Pan, and Way's reef, were very considerably reduced by simply exploding large canisters of gunpowder, by means of a galvanic battery, upon their surfaces. From Aug. 19, 1851, when the first blast was fired, to March 25, 1852, 284 charges, containing 34,231 lbs. of powder, were exploded upon Pot rock, removing about 10 feet of its depth, as careful soundings have since shown, although it was asserted at the time that more had been removed. On Frying Pan and Way's reef 240 charges, containing about 28,000 lbs., were exploded, increasing the depth of water considerably. Since this pioneer work of Mr. Maillefert nitro-glycerine has been used in similar operations with much greater and more satisfactory results. In fact, this compound, or some preparation of it, is now employed by the engineer as though it were a kind of chisel for chipping away projections of rock wherever they present themselves. Surface blasting has, however, been abandoned, except for the removal of superficial or unimportant masses of rock. It has been found that when live rock, as firm, undetached, and undisintegrated rock is called, has been reached, the surface blast, even when made with nitro-glycerine, makes so little comparative impression, that it is more expeditious and economical to drill and introduce the charge into the body of the rock. When, however, it forms so much of an obstruction as to require several feet in depth and a considerable horizontal section to be removed, it has been found preferable to make large excavations into the body of the rock from beneath, proceeding according to the method of mining, and to remove the shell by the simultaneous explosion of charges introduced into it. Practical applications of this method will be noticed further on.—When it is designed to bore a tunnel into a mountain, a heading, as it is called, is commenced at the floor of the tunnel and driven in the direction of its axis. If the plane of the floor is not beneath the plane upon which the work is begun, and the surface of the rock is sufficiently perpendicular, the work may be commenced by bringing a carriage, armed with one or more Burleigh or other drills, to the face of the rock, drilling a horizontal line of perforations a short distance above the plane of the floor of the tunnel, driving the

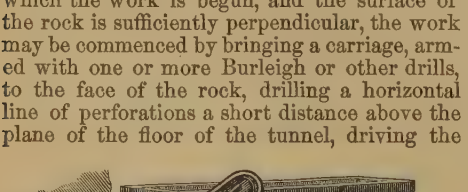


Fig. 2.—Burleigh Drill at Work.

drills in an obliquely downward direction, at an angle of about 45°, charging the holes with gunpowder or nitro-glycerine, and firing them simultaneously by means of the galvanic battery. (See fig. 2.) If necessary, this operation is to be repeated until a step, facing downward and of sufficient depth, is formed to afford the most efficient displacement of rock by subsequent

Section. Front View.

Fig. 3.—Mode of Forming Steps ("Stoping").

blasts. Then another line of perforations is drilled in the step, in a plane parallel with its under surface, at a suitable distance above its edge, which are also charged with the explosive and fired. (See fig. 3.) This process is to be repeated until the arch or crown of the tunnel is reached, and then a new bench is to be formed. This work can be advantageously performed by hand drilling, but when it is convenient to work a power drill its employment will generally afford the greatest progress. When the tunnel is of sufficient height it is usual to drive the heading (H, fig. 4) forward beneath the crown, and to follow with one or more benches (B and B′). The work is always driven against the perpendicular faces of the headings and benches, and in the direction of the axis of the tunnel; but the lamination of the rock may be such as to make it preferable to drill the holes in the upper surface of a bench, as at *b*, and throw the rock horizontally from the face, instead of commencing at *b′* and throwing it downward. Nitro-glycerine may be placed in the drill holes in cartridges, and fired without tamping or with water tamping, its action being so instantaneous that a separation is readily effected in the lateral direction, toward the under surface of the bench. When the floor of the tunnel lies beneath the surface and it cannot so readily be reached otherwise, or where counter tunnelling is desirable, a shaft is sunk to the required plane. The process of excavating a shaft is conducted upon principles similar to those which govern the driving of the tunnel, in so far as the forming of benches and the detaching of the rock in the direction of the line of least resistance is concerned, although a heading, from the nature of the case, could not be driven downward in advance of the rest of the shaft with any advantage. The working will of course be varied according to the structure and composition of the rock, and the position of its strata. It may happen at times that considerable portions can be removed with wedges and levers, and this may be the case in the tunnel as well as in the shaft, but not so frequently. In sinking a shaft a bench is formed, and successive portions are de-

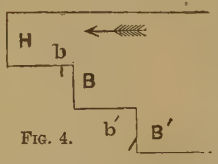


Fig. 4.

tached, either by blasting or other means, until the whole is removed and a new bench formed. The progress made in blasting at the Hoosac tunnel in Massachusetts during the month of March, 1872, in the east end, at a distance of 10,046 ft. from the entrance, was 120 ft. of heading 24 ft. wide and 9 ft. high. This heading was attacked by 12 Burleigh drills, mounted on two carriages manned by eight men and a foreman. On Dec. 12 of the same year the last portion of rock that divided the excavations was removed, and it was found that the axes of the two only differed by the remarkably small error of five sixths of an inch laterally, and an inch and a half vertically. (See TUNNEL.)—In submarine blasting on a large scale, by the modern method, a coffer dam is erected over the rock and a shaft sunk into it, from which tunnels are excavated in radiating directions, and these connected by concentric galleries, while columns of rock are left as supports to the roof, and to maintain the water bed till the work is completed. A sufficient number of charges of an explosive compound are then introduced into the columns in chambers, and in the shell, and simultaneously fired by means of a galvanic battery. When the work is not too extensive and the superincumbent pressure of rock and water is not too great, the columns of rock supporting the roof may be replaced by wooden ones, thus allowing of the removal of a larger amount of material before the final explosion takes place. This is an advantage, since its removal in this way is less expensive than by rakes and grappling irons after it is broken up and lying beneath the water. In such excavations many precautions are required which are unnecessary in boring a tunnel through a mountain. Mathematical calculations and estimates, requiring extensive engineering knowledge and sound judgment, must be made in order to ascertain the amount of resistance required in the arches and in the columns of support, composed as they are of rock of varying composition, texture, and degree and direction of stratification. If a breach should be made in the water bed, the works would be flooded, causing serious delay and expense in making repairs, which must be done by sinking rocks and cement into the breach and pumping the water from the caverns. Moreover, the breach might be so extensive as to be irreparable, in which case the remainder of the rock which had been tunnelled would have to be removed by surface blasting. It frequently happens that small fissures are opened, which under the great pressure of water from above cause serious annoyance, and all the ingenuity and knowledge that can be brought to bear are required to stop the leak. To avoid disturbing the water bed, it is also safer to fire the blasts of nitroglycerine singly with a fuse, and not in numbers simultaneously. It is thus perceived that blasting as now practised is an important branch of the science of civil engineering. With the materials and appliances at hand, in the form of gunpowder, nitro-glycerine, perfect safety fuse, the ready and facile command of galvanic electricity, properly constructed drills, and compressed air engines to propel them, the problems presented to the civil engineer are exceedingly interesting, and offer no obstacles which careful and correct calculation cannot overcome.—The removal of Blossom rock in the harbor of San Francisco is an example of the process of removing submarine rocks by conducting the excavation from within. It is the only operation of the kind which has been completed, although another and more extensive one, previously commenced, is now (1872) in progress at Hallett's point in the East river, opposite New York. The top of Blossom rock was about 5 ft. below the surface of the water at mean low tide. A horizontal section at the depth of 24 ft. measured 195 × 105 ft. The quantity of rock contained within these boundaries was about 5,000 cubic yards, and consisted of a metamorphic sandstone of irregular stratification. The great mass of it was so soft as not to require blasting. In October, 1868, brevet Brig. Gen. B. S. Alexander, lieutenant colonel of engineers U. S. A., communicated a plan for the removal of this rock to Lieut. Col. R. S. Williamson, major of engineers, who had been placed in charge of its survey. Gen. Alexander's plan is briefly explained in the following extract from his communication: "I propose to enclose a small surface of the rock by a water-tight coffer dam; in this space to sink a rectangular shaft about 4 by 9 ft., which is the size I have seen in coal mines; from the bottom of this shaft to run tunnels and make powder chambers in such positions that when exploded the whole rock down to the level of 24 ft. below the level of the water will be lifted in the air and shivered to pieces." In November following, Mr. A. W. von Schmidt, a civil engineer of San Francisco, sent in a plan for the removal of the rock, and offered to perform the work for $75,000, which plan and offer were in due time accepted. His plan was similar to Gen. Alexander's, except that instead of the ordinary coffer dam he proposed to sink an iron cylinder 6 ft. in diameter, carrying an india-rubber flap at its lower end, pump out the water, bore into the rock, and slide another cylinder inside of the first down into the excavation and secure it by cement. It was, however, found difficult to place the iron cylinder in position without first resorting to the ordinary cribwork coffer dam. The sinking of the shaft was commenced Dec. 7, 1869. Only one man could work at a time, but in the space of four weeks a depth of 30 ft. below low water was reached. Drifts were then run into

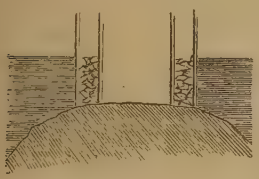


FIG. 5.—Coffer Dam.

the longer and shorter axes of the rock, and steam was used in hoisting. The rubbish was dumped upon one side of the rock, from which most of it was washed by the tide. During the month of January, 1870, eight men found room to work. Most of the rock was removed by picks and sledges, only 10 lbs. of explosive (giant powder) being used in the whole operation. In February 16 men found space to work, and by the 20th of April the dimensions of the cavity were 140 by 60 ft., with a maximum height of 12 ft. Columns of rock were at first left for support, but they were from time to time replaced with upright timbers from 8 to 10 inches in diameter, with the exception of four, which were left standing near the shaft. Preparations were now made to

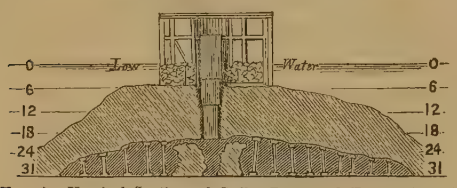


Fig. 6.—Vertical Section of Coffer Dam and Excavation at Blossom Rock.

blow up the shell. The following diagram, copied from the official report, will explain the method of conducting the explosion. Powder

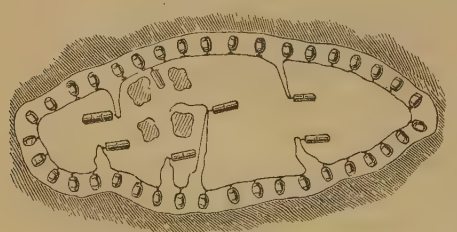


Fig. 7.—Horizontal Section, showing Charges.

was used as the explosive, nitrate of soda taking the place of nitrate of potash in its composition. The quantity used was 43,000 lbs. The vessels for containing it were 38 ale casks of 60 gallons each, and seven old tanks made of boiler iron, holding about 300 lbs. of powder each. The explosion was effected by a galvanic battery stationed in a boat about 800 ft. from the rock. A column of water about 200 feet in diameter was thrown into the air to a height of 200 to 300 ft., and pieces of rock and timber were thrown high above the water column. The rock was found to be effectually demolished, although if the excavations had been carried to a greater depth much after labor in clearing away rubbish and projecting points would have been saved. The contract was fully carried out by Mr. Von Schmidt, under the immediate inspection of Lieut. W. H. Heuer of the corps of engineers.—At New York, the operations of Mr. Maillefert in surface blasting had greatly improved the navigation of the East river; but no comprehensive plan was projected till the summer of 1866, when brevet Major Gen. John Newton was assigned by the war department to the duty of examining the obstructions, and making estimates of the work necessary to be done. He submitted three plans, each of which included the removal of the rock at Hallet's point. Some work was done on some of the smaller rocks by Mr. S. F. Shelbourne, who tried experiments with a rotating diamond drill, and afterward constructed a percussion drill of larger size, which was destroyed by a collision before it was brought to the test of drilling. In the spring of 1869 congress appropriated $175,000 for improvements at Hell Gate, and Gen. Newton proceeded to complete the plans for the performance of the work. The removal of the submarine rock at Hallett's point was the first work decided upon. This rock, projecting some 300 ft. into the stream, and throwing the tide from Long Island sound against an opposing rock called the Gridiron, makes the navigation at that place very difficult. The plan of operation was to sink a shaft upon Hallett's point, and from it excavate tunnels in the rock in a radiating direction under the river and connect them with concentric galleries; then, after removing from the interior as much of the rock as possible without danger of letting in the water, to blow up the roof and supporting columns. The work was commenced in July, 1869. A coffer dam in the form of an irregular pentagon, whose greatest diameter was 140 ft., was erected on the shore, and a shaft 105 by 95 ft. in diameter was sunk to a depth of 32 ft. below mean low water. Diverging tunnels were then commenced, and

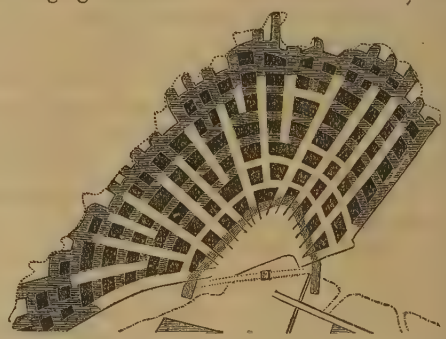


Fig. 8.—Ground Plan of Tunnels and Galleries at Hallett's Point.

after they were sufficiently advanced concentric galleries were excavated, and as the work proceeded their number increased, until at the present time (November, 1872) there are 19 tunnels, some of which are nearly completed, extending from 190 to 240 ft. beyond the shaft, and connected by seven concentric galleries, from which 28,000 cubic yards of rock have been removed. The rock is a tough hornblende gneiss, and lies in strata of various degrees of inclination, presenting interesting prob-

leins. The work has been in satisfactory progress since the summer of 1869, with the exception of one interval, when the available funds were exhausted; but the appropriations have never been nearly equal to what could have been economically expended. The Burleigh drill has been in constant use, but hand drills are also worked with great advantage, as in the progress of the work it is found expedient to use many small blasts of giant powder. When the excavation is completed it is designed to introduce an explosive compound into the columns and various parts of the roof, and produce a simultaneous explosion with a galvanic current. Topographical surveys are continually made during the progress of the work to determine the direction and extent of the excavation, the usual methods of triangulation and levelling being employed. There have been 21,000 soundings and 8,000 borings of the bed of the river, for the purpose of ascertaining the depth of live rock. No accident has happened with the use of nitro-glycerine, owing to the care with which it is prepared, and the prudence with which it is handled. With regard to the preparations of nitro-glycerine, dynamite or giant powder is considered by those who use it to be a safer explosive than gunpowder. Dualline, which is a somewhat similar preparation, has also been used with satisfactory results. The danger in using nitro-glycerine arises principally from the collection of vapors liable to take place when it is confined.

BLAYE (anc. *Blavia*), a fortified town of France, in the department of the Gironde, on the right bank of the river Gironde, 20 m. N. by W. of Bordeaux; pop. in 1866, 4,761. The upper part of the town, with the citadel, lies on a steep rock; in the citadel, which was built by Vauban, the duchess of Berry was imprisoned in 1832. On the opposite side of the river is Fort Médoc, and on an islet between them is a fortified tower called the Pâté de Blaye. The town has been a military station since the times of the Romans. It has a school of hydrography and an active coast trade.

BLEACHING, the process of removing colors from fabrics and raw materials and leaving them white. The principal substances to which bleaching is applied are wool and silk, in the animal, and cotton, flax, and straw, in the vegetable kingdom. The coloring matter in these bodies is not essential to their texture, and fortunately can be removed by chemical agents without injury to the structure of the rest of the material. Steeping cloths in lyes extracted from the ashes of plants, and afterward repeatedly washing and exposing them to the action of sunlight, was practised by the ancient Egyptians; but nothing more than this is known of their process. There was scarcely any progress in the art for thousands of years, or until the 18th century, when some improvements were made in Holland. The Dutch process consisted in pouring the alkaline solution over the goods in a boiling condition, and steeping them in it for about a week, and, after washing, again steeping them for another week in buttermilk. After this they were thoroughly washed and exposed to the action of the air and sunlight for several months. These apparently simple processes obtained for the Dutch a high reputation for bleaching, and gave them almost a monopoly of the business for very many years. For a long period the brown linens manufactured in Scotland were regularly sent to Holland to be bleached. A whole summer was required for the operation; and if the cloths were sent in the fall of the year, they were not returned for 12 months. It was this practice which caused the name of hollands to be given to these linens. The Scotch introduced the business of bleaching for themselves about the year 1749; but it was long believed that the peculiar properties of the water about the bleaching grounds of Haarlem gave to this neighborhood advantages which no other region could possess.—The precise chemical action that takes place in the process of bleaching is not known with certainty, but it is probably due to the action of oxygen when it is in a nascent state, or in that peculiar and active one called ozone. The investigations of Schönbein have proved that atmospheric oxygen, under the influence of sunlight and moisture, passes into an active state, thus explaining the rationale of the old bleaching process. Bleaching by chlorine involves the abstraction of hydrogen from the coloring matter, and the momentary freeing of a portion of oxygen, which enters into a new combination by which it is thought the bleaching is effected. The action of sulphurous acid, which is usually a deoxidizing agent, does, however, according to Schönbein's investigations, on exposure to the air and light, bring a portion of atmospheric oxygen into an active condition. Chemists, therefore, attribute the action of all bleaching agents to the power they possess of causing oxygen to pass into its active state. The art of bleaching was conducted by alternate steeping in alkaline liquors called buckings, followed by thorough washing and boiling and long continued exposure upon grass, with frequent sprinklings of water, which process was called crofting; and this was followed by the souring process, or keeping the articles soaked for weeks in sour milk, to be afterward washed and crofted several times. By substituting dilute sulphuric acid for sour milk to dissolve out the alkaline matters, as suggested by Dr. Hope, the time required for this part of the process was reduced to a few hours in place of a few months. But the other operations still involved long time, particularly the crofting; and frequent losses moreover were incurred by the exposure of the goods in large establishments upon the great extent of grass lands they required. Of cotton goods one twentieth to one tenth of the weight is lost by bleaching; but linens often lose as much as

one third, by which their strength also is considerably impaired: the finer linens lose only from 12 to 25 per cent. In Silesia and Bohemia, where the chlorine process is not adopted, the linens are exposed to a fermenting process, then washed, and steeped in alkaline liquors, with alternate exposures upon grass, which processes are repeated a great number of times for 60 to 70 days; but to render them properly white, they are afterward passed through a bath acidulated with sulphuric acid, then treated again with the potash lye several times and alternately exposed on the grass, and finally thoroughly cleansed by washing in a revolving cylinder called a dash-wheel. This machine is also employed in the English and Scotch processes for washing the goods without subjecting them to unnecessary wear. The frequent repetition of the different processes is rendered necessary by the complete diffusion of the coloring matters through the flax fibres, and their close union with them; each operation decomposing and removing in succession small portions only.—The discovery of chlorine gas by Scheele in 1774 led to the great improvement in bleaching of applying this gas to the removal of the colors. The use of it was originally suggested by the French chemist Berthollet in 1785, and explained the next year by him to Watt of Glasgow, who was then in Paris. By Watt the process was soon introduced into Britain, the gas being used in solution in water. Its preparation was found to be highly injurious to the health of the workmen, and the fibre of the cloth was weakened by the action of the chlorine. Berthollet improved the process by diluting the aqueous solution with water, and also by saturating with potash a portion of the acid. This was the first step toward the preparation of the chloride of lime, which was originally prepared after long continued experimenting by Tennant of Glasgow in 1798. Its first employment was in the form of a saturated liquid solution; but in 1799 he patented the use of the dry chloride of lime. (See Bleaching Powder.) Bleaching by chlorine, as now practised, varies somewhat as applied to the different fabrics; but a succession of different processes is still adopted, as in the old methods. Thus, in bleaching cotton, there are the preparatory operations of singeing off the loose fibres by passing the cloth over heated cylinders; then soaking some hours in water, followed by the dash-wheel; then boiling in lime water, which acts upon the grease, and prepares it for easy removal by the next operation of boiling in water. This is followed by the souring process, which dissolves out the adhering lime, and a succeeding washing prepares the cloth for bleaching. This consists in steeping the cloth in a dilute solution of the chloride of lime, which is called the chemicking process. The liquor consists, for every pound of cloth, of about half a pound of chloride of lime and three gallons of water. Souring and washing succeed this, and these processes are repeated, it may be, several times; altogether they amount, including calendering, to about 25 in number. Though still very complicated, the time of the operation is greatly reduced from that of the old method. In two days is now accomplished what formerly required a whole summer, and the cost of the process amounts to only about 20 cents per piece of cotton cloth of 24 yards. Bleaching linens with chlorine, though somewhat more expeditious than the process already referred to in Bohemia and Silesia, is still a tedious operation, and probably is susceptible of great improvements. It involves from 8 to 20 different processes of steeping, boiling, washing, souring, &c., with exposure upon the grass for from 30 to 60 days. Without this exposure a longer time is required for the bleaching action of the solution of chloride of lime. Rags are bleached for the papermakers, after being thoroughly washed in the engine and reduced to what is called half-stuff, by soaking them from 6 to 12 hours in a solution of chloride of lime; from 2 to 4 lbs. of the dry chloride being used for every cwt. of rags. When the rags are strongly dyed, it is often necessary to add some sulphuric acid (half the weight of the bleaching powder), and cause the mixture, with the rags placed in it, to revolve for some time in a tight cylindrical vessel, till the chlorine evolved has removed the colors. This process is followed by thorough washing. —Wool requires a thorough preparation called scouring, to free it from the soapy and waxy matters exhaled from the skin of the sheep. Weak ammoniacal lye is found efficient for this purpose, and this is obtained by boiling putrefied urine with four to eight times its quantity of soft water. The wool is steeped and well washed in a warm bath of this liquor, until all the impurities are converted into soapy matters and removed by rinsing in clean water. Caustic soda is sometimes used instead of ammoniacal liquors. Chlorine cannot be employed to bleach animal fibre, because the nitrogen they contain causes them to become yellow, and sulphurous acid is the agent which is generally used instead. Bleaching by sulphurous acid depends upon the production of colorless sulphites, the decomposition of which, however, by alkalies or by prolonged exposure, will allow the color to reappear unless they are removed. This is accomplished by thoroughly washing the goods after the application of the acid. Woollen materials are generally bleached by hanging them in a moistened state in close chambers and passing the vapor of burning sulphur over them; sometimes, however, a solution of the acid in water is used. After sulphuring they are washed and exposed to the air. The process may be briefly described as follows: 1. They are immersed three times in a bath composed of 24 lbs. of carbonate of soda, 6 lbs. of soap, and 130 gallons of water, at a temperature of 105° F. The bath is removed after each immersion by the addition of three fourths of a pound of soap. The goods

are immersed by passing them over a roller, and this bath answers for about 2,000 yards of material. 2. They are then washed twice in clean water at 105° F. 3. Passed three times through a soda solution of the strength of the first solution, adding half a pound of carbonate of soda after each passage. 4. Exposed for 12 hours to the vapor of burning sulphur, using of this about 24 lbs. to 2,000 yards. 5. Passed three times through a bath containing 30 lbs. of carbonate of soda to 130 gallons of water, at a temperature of 124°, adding three fourths of a pound of soda after each immersion. 6. The cloth is again subjected to the sulphur vapor, as in the previous operation. 7. A repetition of the fifth process. 8. Washed twice in water at a temperature of 105° F. 9. Subjected to sulphur vapors for 12 hours. 10. Washed in tepid, and then in cold water. 11. Tinged blue by passing through a bath containing indigo and carmine.—For the bleaching of silk sulphurous acid is also used, but previous to its application the raw silk must, as in the case of wool, be freed of matter which would interfere with the process. Silk contains, according to its quality, from 25 to 35 per cent. of extraneous matter, which was formerly considered to be a kind of gum, and is still called by that name. The investigations by M. Roard, however, have shown this substance to consist of albumen, wax, fat, resin, and coloring matter, and to have the properties of a varnish. After numerous experiments it has been found that nothing removes this varnish so well as a hot soap bath kept somewhat below the boiling point. From 30 to 40 lbs. of very fine soap are used for every 100 lbs. of silk; but the proportions vary according to the uses that are to be made of the articles. After steeping, the silks are well washed, put into linen bags, and boiled for an hour and a half in a weaker solution of soap. Different shades of white are given to the silk, without further bleaching, by the use of very weak dyes of litmus or indigo. A pure white is obtained by the sulphuring process. The Chinese are said not to use soap in cleaning their silks. One Michel de Grubbens, who lived in Canton a long time and practised the Chinese method, published in the memoirs of the academy of Stockholm an account of it, according to which they use a small white bean, and also wheat flour and common salt. It is probable that the fineness of Chinese silk is owing much to the superiority of the raw material. The process of bleaching silk proposed by Baumé would be an important improvement if it were not too expensive. It consists in macerating the raw silk in 32 parts of alcohol and 1 part of muriatic acid for about 48 hours, when the silk is quite white.—Wheat straw is grown in Tuscany without reference to the grain. The seeds are sown broadcast, and the straw is cut when the grain is in the milk. It is thin and short, but of fine texture. On being cut, it is dried for a few days in the sun, then stacked in bundles, and dried in the mow for a month. After this, it is partially bleached by exposure upon the meadows to the dews and sun; and the process is completed by steaming and sulphuring. In England, a boiling solution of caustic soda is employed to dissolve the hard natural varnish upon the outside of the straw; after which the usual bleaching process, with sulphurous acid or chlorine, is applied. This hard coating, it is said, may also be removed with economy by several steepings in dilute alkaline solutions, alternating with others of chloride of lime and the vapor of sulphurous acid. —Chlorine is the most common agent employed for bleaching a variety of other substances besides those already named; as, for example, wax, and articles of paper, as maps, prints, books, &c. But frequently, colors imparted to cloth by strong dyes require for their removal different chemical reagents, as chromic acid, or the combination of this with potassa. Protochloride of tin is also employed for the same purpose. These are called discharges, and are principally made use of in calico print works.—The whitening of candles, paraffine, sugar, &c., will be described in treating of those articles. Wax was formerly bleached merely by exposing it to sunlight and moisture; but since the discovery of chlorine that gas has been the agent generally used. The wax is scraped into very fine shreds and put into a tub of water having a tight cover; chlorine gas is then introduced at the bottom of the tub, while an agitator stirs the water. The bleaching is effected in about two hours, when the wax is melted into cakes. A process has been introduced in France of bleaching wax, which is also applicable to oils, by melting it in hot steam, and subjecting it to its action in passing through a kind of worm. It is also washed with hot water alternately with the steaming. —Hydrate of alumina, prepared by decomposing alum by carbonate of soda, has recently been substituted for animal charcoal, for decoloring liquids. Experiments made by M. Ch. Méric, chemist of the metallurgical works at Creuzot, show that 15 grammes of alumina may replace 250 grammes of animal charcoal, in decoloring a quart of water colored by 10 grammes of litmus; or for sirup colored by molasses, 7 grammes of alumina were equivalent to 125 of animal charcoal. The alumina is, moreover, restored with less expense than the charcoal.—We pass to the consideration of the process for bleaching cotton, which has long been extensively known as the "American bleaching." Before the year 1836 Dr. Samuel L. Dana, acting as consulting chemist to the Merrimack manufacturing company of Lowell, Mass., had completed an investigation on the adhering and coloring matters of the cotton fibres, which led him to devise and carry into practice the application of chemical agents in such order as to insure uniform results in bleaching. The resino-waxy envelopes of the fibres, as well as the accidental starchy, albu-

minous, and oily bodies present in the manufactured goods, are by this method resolved into soluble compounds and removed; and when in 1837 the process as practised became known to the scientific bleachers and printers of Mühlhausen, it drew forth their expressions of admiration for its completeness. This method is founded on the two following principles: 1. The conversion of the fatty and waxy matters into soaps; and for security and economy, it is preferable that these soaps should have alkalino-earthy bases; caustic lime becomes, therefore, a most effectual agent. 2. The decomposition of the basic soaps formed, so as to convert them into soluble soaps, which is effected by the action of an alkaline carbonate. These are the cardinal principles on which this almost perfect process is founded, but there are practical points of interest. After the principles were published, M. Auguste Scheurer of Mühlhausen suggested the passing of the goods from the lime into diluted acid. This step, by no means essential, increases the certainty of an easy decomposition of the lime soap, as the acid seizing the base enters into combination with it, leaving the fatty acid free to combine with the base of the alkaline carbonate, and form soluble soap. In describing the process as almost perfect, a point was in view which called for this qualifying phrase. Dr. Dana found that after the new process had been applied, and modified applications had been made, there still remained adhering to the fibre a substance which has many of the characters of wax. This substance he studied at great length, separating it from bleached cotton by means of boiling alcohol, which deposits it on cooling. Its few affinities do not allow of the application of any special agent for removing it wholly; while the solution of rosin in alkali, combining with it, dissolves a portion. This body, unlike wax in its relation to coloring matter, becomes tinted in ordinary madder printing at the points where it is desirable that white ground only should appear, and no modification of bleaching methods has yet met or overcome this difficulty. The steps of the process are as follows: 1. Steep the cloth in water at a temperature of about 90° F. for 24 hours. 2. Pass through a bath of milky caustic lime, containing 60 lbs. for 2,500 lbs. of cloth. 3. Boil the cloth as it passes from the second operation six hours, counting from the moment ebullition actually occurs, under a pressure of 40 to 50 lbs. to the square inch. 4. Wash through the washing machine. 5. Pass through a bath of sulphuric acid, diluted till it marks 2° B. 6. Wash in machine. 7. Boil six hours, under a pressure of 40 to 50 lbs. to the square inch, in a solution of carbonate of soda, containing 100 lbs. for 2,500 lbs. of cloth, and in which 40 lbs. of common rosin have been previously dissolved. 8. Wash in machine. 9. Pass in washing machine through a clear solution of chloride of lime, marking 1° B. 10. Expose the cloth, as it is folded from the machine into pits with open sides, to the action of the air and carbonic acid, still saturated with the solution of chloride of lime. 11. Pass in washing machine through sulphuric acid and diluted to 2° B. 12 and 13. Wash twice in machine. The boiling is done in Barlow's kiers, which are especially adapted to this process, which has come to be regarded both in this country and Europe as the simplest and best in use.

BLEACHING POWDER. By the action of chlorine gas upon hydrate of lime, a compound is produced which is known by the common name of chloride of lime. By the calico printers, and others who make use of it for its bleaching properties, it is called bleaching powder. It is also known as hypochlorite of lime, chlorinated lime, &c. The compound was first prepared by Mr. Tennant of Glasgow, in experimenting upon the best applications of chlorine to bleaching purposes. He first made it in the form of the saturated liquid solution; and in 1799 he took out a patent for impregnating dry quickline with chlorine. By the suggestion of one of his partners, slacked lime, or the hydrate, was substituted for the quicklime, having the property of absorbing large quantities of the gas, which the quicklime has not. In preparing it, a pure quality of lime is required, free from iron, clay, and magnesia, the presence of which would seriously affect the bleaching process. It should also be well and freshly burned, and freed from all carbonic acid. Enough water is then to be added to it to cause it to fall into a fine white powder, which is the hydrate of lime. Chlorine is prepared by several different processes. One of these, still common, though becoming superseded by other methods and by modifications, consists in decomposing hydrochloric acid by heating it in contact with coarsely pulverized black oxide of manganese. This substance furnishes a large amount of oxygen gas, which in mutual decomposition unites with the hydrogen of the hydrochloric acid to form water, setting free the chlorine, an atom of which takes the place of the oxygen, forming chloride of manganese, and another atom escapes. These changes are represented by the following formula, the first part of the equation being the materials employed, and the second the products obtained: $4HCl + Mn_2O_2 = 2H_2O + 2MnCl + 2Cl$. Another process consists in mixing the manganese oxide with common salt and adding sulphuric acid. The changes which are then effected are represented as follows: $2NaCl + 2H_2SO_4 + Mn_2O_2 = Na_2SO_4 + Mn_2SO_4 + 2H_2O + 2Cl$. It is important that the manganese ore should be of the purest quality, in order to obtain from it the largest quantity of oxygen gas. Black oxide of manganese when pure gives up at a white heat 33·1 per cent. of its weight of oxygen, and passes into the red oxide. Chlorine gas is thus prepared in large alembics or stills, which are made of cast iron, where exposed to strong heat, and in part of strong

sheet lead; or sometimes of stones closely fitted and cemented to each other. The lower portion is sometimes made double for the purpose of introducing steam to heat the mixture in the inner vessel. The materials introduced are in the following proportions, rated as if pure, but varying with their impurities: binoxide of manganese, 100 parts; common salt, 150 parts; and sulphuric acid, of specific gravity 1·6, about 185 parts. The temperature is kept at about 180° F., and the materials are kept in agitation by a stirrer, which is made to revolve in the lower part of the vessel. As the gas is evolved, it passes by a lead pipe to the purifier, and into the top of the chamber in which the hydrate of lime is deposited in trays, which are placed upon shelves. Heat is generated by the chemical combination; but it should not be allowed to exceed 62° F., the supply of chlorine being checked to keep the temperature down. For two days the process goes on, when it is stopped, that the workmen may enter with half a set of trays of fresh hydrate of lime to replace an equal quantity which has been exposed four days to the action of the gas, and to stir over that which has been in two days. Half a charge is thus taken out every two days. When well made, it should be a uniform white powder, without lumps, smelling of chlorine, dissolving with little residue in 20 parts of water with alkaline reaction, and attracting moisture very slowly from the air. When prepared in a liquid state, the gas is passed into lime water, till this is saturated with it. The solution, for the quantity of lime it contains, is stronger than the dry powder, but it is not so permanent in character, the chlorine sooner escaping from it.—Mr. Tennant of Glasgow employs a method devised by Mr. C. T. Dunlop for liberating chlorine from common salt with nitrate of soda and sulphuric acid. If one equivalent of nitrate of soda and three of chloride of sodium are decomposed by sulphuric acid, nitrous acid, hydrochloric acid, and chlorine are generated. The acids are separated by passing all three of the gases successively through sulphuric acid and water. The chlorine, not being absorbed by either the acid or the water, may be passed on into the lime chamber. The process of Mr. Weldon consists in neutralizing the residual liquor containing manganese chloride, which is produced in the ordinary process, with hydrochloric acid and manganese oxide, with finely divided carbonate of lime. This produces a neutral mixed solution of chloride of manganese and chloride of calcium, holding in suspension considerable sulphate of lime and small quantities of oxide of iron and alumina. The mixture is then pumped into settling tanks, where these substances subside, leaving the liquor clear, which is then run off into a vessel called the oxidizer. Air is forced through it and milk of lime added until the manganese in the liquor is principally converted into peroxide. This process is now extensively employed. Deacon's process, designed to obviate the use of manganese oxide, is founded on the fact that if a mixture of hydrochloric acid and oxygen is heated in the presence of certain substances, a catalytic force causes the decomposition of the hydrochloric acid, the hydrogen combining with the oxygen, while the chlorine is set free. The gases are passed through a reverberatory furnace heated to 700° or 750° F. over pieces of brick which have been saturated with a solution of sulphate of copper, and dried.—The precise chemical constitution of chloride of lime has always been a subject of controversy, which can hardly be held as settled at the present time. Dr. Ure considered the commercial article as a mixture, in no definite proportions, of chlorine and hydrate of lime, and believed that the more definite compound prepared with dry calcium hydrate contained chlorine in direct combination with the hydrate. Fresenius regards it as a mixture of calcium chloride, CaCl, and calcium hypochlorite, CaOCl or $CaClO_2$; and this is the view taken by Wagner and others. These opinions, it must be borne in mind, relate to the pure, dry article, and not to the commercial one. The subject has lately been carefully investigated by Kolb (*Jahrbücher*, 1867), who finds that the most concentrated preparation which can be produced by saturating dry calcium hydrate with chlorine contains 38·5 per cent. of chlorine, 45·8 of lime, and 24·7 of water, in which the water and the whole of the lime are essential constituents. Commercial bleaching powder contains more water as well as free lime. Dry chloride of lime is decomposed by water with separation of calcium hydrate and the formation of a solution containing chloride and hypochlorite of calcium. Kolb, reasoning from the fact that dry bleaching powder and the solution comport themselves differently under the influence of free chlorine and heat, thinks that the first does not contain a ready-formed hypochlorite, but is a compound which may be represented by the formula $Ca_3H_6O_6Cl_4$. Dry chloride of lime, moreover, is completely decomposed by carbonic acid with evolution of chlorine, while only half the lime is precipitated from the solution by this agent, with separation of hypochlorous acid, which does not act upon the remaining chloride. Solid chloride of lime in moist air behaves in the same way, from which it appears that bleaching powder, on exposure without the addition of an acid, yields hypochlorous acid and not free chlorine. For the determination of the available amount of chlorine in a given quantity of bleaching powder, see CHLORIMETRY.

BLEDOW, Ludwig, a German chess player, born July 27, 1795, died Aug. 6, 1846. He was a teacher of mathematics, and founded the so-called Berlin chess school and the first German journal on chess, *Berliner Schachzeitung*. He published two small collections of outlines of games, and edited the work of the Syrian chess player Stamma. His extensive collection of

works relating to chess was purchased by the royal library of Berlin.

BLEDSOE, a S. E. county of Tennessee, drained by the Sequatchie river; area, 480 sq. m.; pop. in 1870, 4,870, of whom 709 were colored. It has an uneven and partly mountainous surface. Coal is found in several places. The chief productions in 1870 were 22,034 bushels of wheat, 201,667 of Indian corn, and 21,550 of oats. There were 1,137 horses, 1,354 milch cows, 3,969 other cattle, 5,555 sheep, and 11,048 swine. Capital, Pikesville.

BLEDSOE, Albert Taylor, an American author and instructor, born in Kentucky about 1808. He entered the military academy at West Point in 1825, graduated in 1830, and served on the frontiers till 1832, when he resigned. In 1833–'4 he was professor of mathematics in Kenyon college, Ohio; in 1835–'6, in Miami university. In 1840–'48 he practised law at Springfield, Ill. In 1848–'53 he was professor of mathematics and astronomy in the university of Mississippi, and in 1853–'61 professor of mathematics in the university of Virginia. He took part with the confederates in the civil war. He is author of "An Examination of Edwards on the Will" (1845); "Theodicy, or Vindication of the Divine Glory" (1856); and "Essay on Liberty and Slavery" (1856). After the war he went to England, where he remained for some time. Returning to America, he took up his residence in Baltimore, and is editor of the "Southern Review," published at St. Louis, under the auspices of the Methodist Episcopal Church South.

BLEEK. I. Friedrich, a German theologian, born at Ahrensbök, Holstein, July 4, 1793, died in Bonn, Feb. 27, 1859. He studied under De Wette, Schleiermacher, and Neander, and after being connected with the university of Berlin, was for 30 years (1829–'59) professor of theology in Bonn. His principal work, *Der Brief an die Hebräer*, is a translation of and commentary on the epistle to the Hebrews (3 vols., Berlin, 1828–'40). In his *Beiträge zur Evangeliencritik* (1846) he vindicated the authenticity of the Gospel of St. John against the attack of the new Tübingen school. After his death appeared other works, the most important of which are *Einleitung in das Alte Testament* (edited by his son, the Rev. Johann Friedrich Bleek, and by Camphausen, Berlin, 1860), and *Einleitung in das Neue Testament* (edited solely by the former, 1862). **II. Wilhelm Heinrich Immanuel,** a German philologist, son of the preceding, born in Berlin, March 8, 1827. He studied at Berlin and Bonn, and accompanied Baikie's expedition to the Niger in 1854; but ill health compelling his return after his arrival at Fernando Po, he accompanied Bishop Colenso to Natal in 1855, and the next year removed to Cape Town, where Sir George Grey subsequently appointed him director of the library which he had presented to the colony. He published a "Vocabulary of the Mozambique Languages" (London, 1856); a "Catalogue of Sir George Grey's Library" (1858–'9); "Comparative Grammar of South African Languages" (2 vols., Cape Town and London, 1862–'9), &c.; and he was the principal author of a "Handbook of African, Australian, and Polynesian Philology" (3 vols., London and Cape Town, 1858–'63).

BLEIBTREU, Georg, a German painter, born at Xanten, Rhenish Prussia, March 27, 1828. He studied at Düsseldorf, and has resided in Berlin since 1858. His "Battle of Waterloo" and several other works are in the gallery of the prince of Hohenzollern-Sigmaringen. The national gallery of Berlin commissioned him to paint "The Battle of Königgrätz."

BLEMYES, or **Blemmyes,** an ancient nomadic race of Africa, who appear to have occupied different regions at different epochs. In Ptolemy's time they held the territory between the Astaboras (Bahr-el-Azrek) and Astapus (Atbara). Older authorities speak of them as extending beyond the desert of Libya. In the 2d century A. D. they had become very powerful about the borders of Egypt, then under Roman rule, and even made warlike and predatory expeditions into the province. Diocletian made extensive concessions to their powerful chiefs, and gave up to them the parts of Nubia held by the Romans. They continued their hostile expeditions, however, and as late as the 7th century molested the inhabitants of the territory about them. Several ancient writers represented the Blemyes as a fabulous race, and many stories were current of their savage and ferocious appearance and habits. The Bishareen, Ababdeh, and other tribes of the present day are supposed to be their descendants.

BLENDE (Ger. *blenden*, to deceive), a common ore of zinc, so named because, while often resembling galena, it yielded no lead, and thus deceived the miners. Another name for it is sphalerite, from *σφαλερός*, treacherous. When pure it is composed of sulphur 33, zinc 67=100; but part of the zinc is often replaced by iron, and occasionally by cadmium. It sometimes occurs in brilliant tetrahedral crystals, also fibrous, radiated, and massive. Its lustre is resinous to adamantine; color brown, yellow, black, red, green—white or yellow when pure. The English miners call it blackjack. Blende is found in both crystalline and sedimentary rocks, usually associated with galena, also with barite, fluorite, siderite, and ores of silver. It abounds with the lead ore of Missouri, Wisconsin, Iowa, and Illinois, and has been found in many other localities in the United States. Derbyshire, Cumberland, and Cornwall afford different varieties; also Transylvania, Hungary, the Hartz, Sahla in Sweden, and many Saxon localities.—Owing to the difficulty of working this class of ore, it was formerly allowed to accumulate about the mouths of mines, and was not economized for zinc. In modern times, with improved metallurgical processes, zinc is largely made from

blende, both in Europe and the United States. Calamine is preferred, but where this cannot be had, the blende is no longer thrown away. By oxidation blende sometimes changes to zinc vitriol, and in the Hartz much zinc is reclaimed in this way. In 1863 Professors Reich and Richter of Freiberg discovered a new metal associated with zinc in blende, to which they gave the name indium, from the blue lines it produced on the spectrum.—The word blende is used to designate sulphur ores in general; for example, copper blende, manganese blende, and silver blende are the sulphur compounds of those metals.

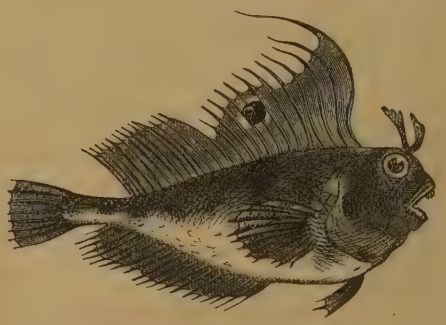
BLENHEIM, or **Blindheim,** a village of Bavaria, on the Danube, 23 m. N. N. W. of Augsburg. It was the scene of a battle on Aug. 13, 1704, between the English and Austrians, under the duke of Marlborough and Prince Eugene, and the French and Bavarians, commanded by Tallard, Marsin, and the elector of Bavaria. The Anglo-Austrian army numbered about 52,000 men, while that of the French and Bavarians was 56,000 strong. After a fierce contest the duke of Marlborough forced Marshal Tallard to surrender with about 18,000 men, while Eugene utterly routed the Bavarians. There were upward of 10,000 men killed and wounded on the French and Bavarian side, while hundreds were drowned in the Danube. The English lost 5,000 killed and 8,000 wounded. On the European continent this is generally called the battle of Höchstädt, from a small town near the scene. The battle decided the campaign; Bavaria fell into the hands of the Austrians, and the prestige of Louis XIV. was gone. In reward for this victory Queen Anne bestowed upon Marlborough a tract of land since called Blenheim park, containing 2,940 acres, near Woodstock, Oxfordshire; and upon this was erected, with a parliamentary grant of £500,000, a magnificent residence called Blenheim house, after a design by Sir John Vanbrugh. It was completed in 1715.—Another notable battle occurred near Blenheim in 1800, when the French defeated the Austrians.

Blenheim House.

BLENNERHASSETT, Harman, a victim of Aaron Burr's conspiracy, born in Hampshire, England, Oct. 8, 1764 or '65, died in the island of Guernsey, Feb. 1, 1831. He was of Irish descent, and was educated in the university of Dublin and called to the bar; but becoming discontented with the condition of Ireland, he sold his Irish estates for more than $100,000 and sailed for New York in 1797. After spending some time in studying the country, he purchased an island of 170 acres in the Ohio river, two miles below Parkersburg, on which he built a fine mansion and made all the embellishments which wealth and taste could supply. His home became widely known for its elegance and the culture which distinguished its inmates. Among the visitors to this beautiful retreat was Aaron Burr, who went there in 1805 to make the acquaintance of Blennerhassett. By his skilful address he soon enlisted him in his Mexican schemes, in the belief that the country was likely to be involved in war with Spain, and a fortune might easily be made by enterprise. Burr was to be emperor, and Blennerhassett a duke and ambassador to England. Blennerhassett invested largely in boats, provisions, arms, and ammunition. He left his home and family and went to Kentucky, where being warned of Burr's real designs, he returned to the island greatly disheartened. However, through Burr's repeated solicitations, and the persuasions of his wife, who had now enlisted in the undertaking with her whole soul, he persisted. A proclamation against the scheme having been published by President Jefferson, Blennerhassett, who was in hourly expectation of being arrested, escaped from the island Dec. 10, and, managing to elude pursuit, joined Burr's flotilla at the mouth of the Cumberland river. He was afterward arrested and sent to Richmond for trial (1807); but the case against Burr resulting in acquittal, the other conspirators were discharged. Bankrupt in fortune and broken down in mind, Blennerhassett retired to Natchez. His island had been seized by creditors, everything upon it which could be converted into money had been sold at a ruinous sacrifice, and the beautiful grounds

were used for the culture of hemp, the mansion being converted into a storehouse for the crops. In 1811 he endeavored to recover from Gov. Alston, Burr's son-in-law, $22,500, a balance of some $50,000, for which he alleged Alston was responsible. Unless this was paid he threatened to publish a book which he had prepared exposing the whole conspiracy. He afterward bought 1,000 acres of land near Port Gibson, Mississippi, for a cotton plantation; but the war of 1812 prostrated all commercial enterprises. Becoming continually poorer, in 1819 he removed with his family to Montreal, where he practised law for a time. He sailed for Ireland in 1822, to prosecute a reversionary claim still existing there. In this he failed; nor did he meet with any success in his application for aid to the marquis of Anglesey, whom he had formerly known. He endeavored to procure employment from the government of Portugal, and from the South American republic of Colombia; projected some improvements in firearms; and tried to obtain a situation as companion to an infirm kinsman. During the later years of his life he was supported by a maiden sister, who had a small estate, which she left to his wife and children.—His wife, the daughter of Governor Agnew of the Isle of Man, was a woman of much talent. About 1822 she published a volume of poems, "The Deserted Isle," and in 1824 "The Widow of the Rock, and other Poems," which contain many fine passages. In 1842 she returned to America, and petitioned congress for a grant of money for the spoliation of her former home. The petition was presented by Henry Clay, and a committee of the senate reported favorably upon it; but she died before the bill was acted upon, and was buried in New York by sisters of charity.—Blennerhassett had three sons, the youngest of whom, Joseph Lewis, became a lawyer in Missouri, and furnished the original documents for the "Blennerhassett Papers, with a Memoir," by William H. Safford (8vo, New York, 1864).

BLENNY, a name given to several spiny-rayed fishes of the goby family, but especially to the genus *blennius* (Cuv.). They have the body covered with a thick coating of mucus, in which are imbedded small soft scales; the ventral fins are in advance of the pectorals, and generally have only two rays; head blunt and rounded; dorsal fin long, generally with the edge interrupted; teeth slender, in a single row. The species are small in the true blennies, 2½ to 5 inches long, living in small shoals; active and tenacious of life, they crawl out of water in crevices of rocks, hiding among the weeds till the next tide. Several species are described in northern Europe, distinguished from each other and from allied genera by the number of the fimbriated appendages about the head. One called the butterfly fish or the eyed blenny (*B. ocellaris*) has a dark brown spot on the dorsal fin. The genus *pholis*, called in England the shanny, has no appendages on the head. The *B. serpentinus* of our coast attains a length of 18 inches; the

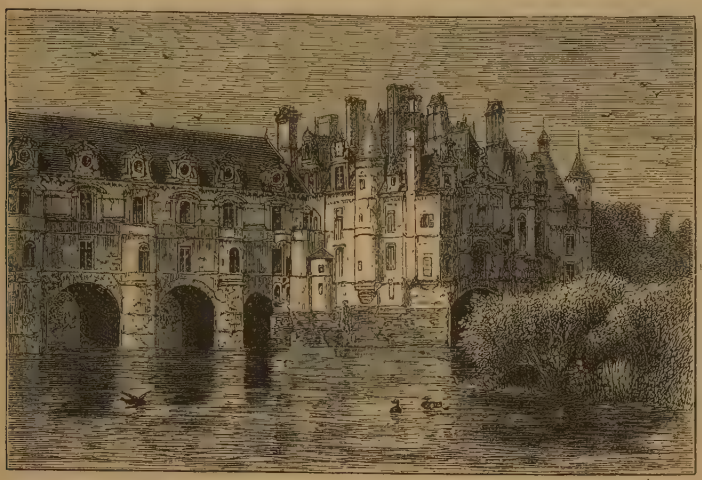


Blenny (Blennius ocellaris).

American shanny resembles the European. The gunnels (*gunnellus*, Flem.) are also blennies, with an elongated body, velvet-like teeth, very long and low dorsal fin, and ventrals exceedingly small; one species, called the butter fish, attains the length of a foot. In the genus *zoarces* (Cuv.) the dorsal, anal, and caudal fins are united, which, with the elongated body, have obtained for it the name of eelpout. The ventrals are under the throat and small. This genus includes the viviparous blenny, *Z. viviparus* of Europe and *Z. anguillaris* of this country. The young are brought forth alive, and able to provide for themselves as soon as excluded; they appear to be produced of a size proportionate to the mother. From the green hue of the bones when boiled, a common English name for it is "green-bone." In this blenny the ovarian bag of the mature eggs is a double sac, having a disk of considerable size at the upper part, where the spermatozoa may come into contact with the yolk membrane. The American species attains a length of 3½ feet, and is occasionally caught by cod-fishers, who call it ling and conger eel; it is of a light salmon color, with irregular olive blotches. The blennies feed upon mollusks and crustaceans, and the flesh of the young of the larger species is very good. They use their ventral fins almost as legs to climb on the rocks; the small size of the branchial openings, preventing the rapid escape of water from and the entrance of air into the gill chamber, enables them to live several hours out of water. They are said to have no air bladder or rudimentary lung.

BLÉRÉ, a town of France, in the department of Indre-et-Loire, on the left bank of the Cher, 15 m. E. S. E. of Tours; pop. in 1866, 3,561. In the vicinity stands the castle of Chenonceaux. Originally a simple manor house, it was enlarged during the reign of Francis I. to its present dimensions. Henry II. purchased it in 1535, and gave it to Diana of Poitiers, who, before completing the magnificent embellishments which she had commenced, was

forced to yield it to Catharine de' Medici. The latter adorned the castle still more richly, and surrounded it with a beautiful park. It after-



Castle of Chenonceaux.

ward came into the possession of the house of Condé, and after many vicissitudes was purchased in 1733 by Gen. Dupin, whose accomplished wife made it the resort of some of the most celebrated men of the 18th century. Montesquieu, Voltaire, Fontenelle, Bolingbroke, Buffon, and others, were among its frequent visitors. The castle is still in excellent preservation. The remains of a Roman aqueduct are to be seen near the city. Bléré is the entrepot of the trade along the Cher, and is especially noted for its red wines.

BLESSINGTON, Margaret, countess of, an Irish woman of letters, born near Clonmel, Sept. 1, 1789, died in Paris, June 4, 1849. She was the third daughter of Mr. Edmund Power, and when only 15 years old married Capt. Farmer. The marriage was an unhappy one, and within four months after her husband's death in 1817 she married Charles John Gardiner, earl of Blessington. With him she saw much of fashionable life, and travelled extensively on the continent. She formed an intimate acquaintance with Lord Byron at Genoa; and at Paris, where she lived for some time with her husband, Count d'Orsay was an inmate of their house. D'Orsay had married and afterward been separated from a daughter of the earl by a former wife. Soon after the earl's death, which took place at Paris in 1829, Lady Blessington went to reside at Gore House, Kensington. Her social position was somewhat compromised by her intimacy with Count d'Orsay, but she gathered at her house a brilliant circle of the notable people of the day. Her expensive manner of living greatly impaired her fortune, and she resorted to the pen mainly for the purpose of enlarging her means. She first appeared as an author in 1825, with some London sketches entitled "The Magic Lantern," which were followed by "Travelling Sketches in Belgium." Her "Conversations with Lord Byron," published first in 1832 in the "New Monthly Magazine," afterward appeared in book form, and excited a considerable degree of interest. Subsequently she published "Desultory Thoughts and Reflections," and several novels; among them "Grace Cassidy, or the Repealers," "The Two Friends," "Meredith," "Strathern," "Marmaduke Hubert," "The Governess," "The Victims of Society," &c. The last named is considered one of her best works. Besides her novels, she wrote illustrated books of poetry, and books of travel, as "The Idler in France" and "The Idler in Italy," and at the same time she was an active contributor to many English magazines, and the editor of fashionable annuals. In 1849 Count D'Orsay went to Paris in the hope of obtaining some preferment from Louis Napoleon, then president of the French republic; and she followed him thither, but died soon after reaching that capital.—See Madden's "Literary Life and Correspondence of the Countess of Blessington" (3 vols. 8vo, 1855).

BLICHER, Steen Steensen, a Danish author, born at Vium, province of Viborg, Oct. 11, 1782, died at Spentrup, Jutland, March 26, 1848 He was a graduate of the university of Copenhagen, and a clergyman at Thorning and at Spentrup. He translated Ossian (2 vols., 1807–'9), published poems (1814–'17), and wrote for the album *Sneeklokken* (1826) and the monthly magazine *Nordlyset* (1827–'9). In some of his best ballads he employed the dialect of Jutland, and he described the popular life of that country in some of his novels. His select poetry was published at Copenhagen in 2 vols., 1835–'6, and a third complete edition of his works in 1861–'2, in 8 vols.

BLIDAH, or **Blida,** a town of Algeria, on the borders of the fertile plain of Metidjah, 25 m. S. S. W. of Algiers; pop. in 1866, 9,975. It is a station on the first railway ever built in Algeria. It was taken by the French in 1830, but first occupied by them in 1838.

BLIGH, William, an English navigator, born in 1753, died in London, Dec. 7, 1817. He was a lieutenant in the navy, accompanied Cook on his voyages in the Pacific, and when he returned was appointed commander of the Bounty, commissioned by George III. to import the breadfruit tree and other vegetable productions

of the South Sea islands into the West Indies. He sailed from Spithead for Tahiti Dec. 23, 1787, and reached his destination Oct. 26, 1788. He remained until the 4th of April following, when he set out for Jamaica with 1,015 bread-fruit trees, besides a variety of other plants. On the morning of the 28th of April a large portion of the crew mutinied, and he with 18 others was set afloat in the ship's launch, with a 28-gallon cask of water, 150 pounds of bread, 32 pounds of pork, and a small quantity of rum and wine, and only a quadrant and compass to direct their course. In 46 days they reached the Dutch island of Timor, having run a distance of 3,618 nautical miles, and scarcely having an opportunity to rest on shore or add to their supplies, without the loss of a single man. Bligh proceeded to England at the first opportunity, arriving March 14, 1790, and published a narrative of the mutiny, which excited a good deal of sympathy, though it was afterward believed that the outbreak was caused by his harsh treatment of his men. Fourteen of the mutineers who had remained in Tahiti were arrested in 1791 by the officers of the Pandora; four were lost by shipwreck on the passage to England, and the remaining ten tried and three executed, the rest being acquitted or pardoned. Another portion of the crew took possession of the Bounty and settled on Pitcairn island. (See Adams, John, and Pitcairn Island.) Lieut. Bligh was sent out again on a similar mission in 1791, brought a large number of breadfruit trees from Tahiti to the West Indies, and sowed the seeds of European vegetables in Tasmania. In 1806 he was made governor of New South Wales, but his tyrannical conduct provoked the subordinate civil and military officers to arrest him and send him to England.

BLIND, The, persons who have not the sense of sight. In common use the term also includes persons who possess some power of vision, but not sufficient to enable them to distinguish the forms of objects. The causes of blindness are both ante-natal and post-natal. It is contended by some that psychological influences may induce blindness in the offspring, as when the mother has received a powerful nervous impression from witnessing some horrible spectacle, or an extremely disgusting case of sore eyes or malformation, and cases have been adduced which are supposed to establish the theory; but the probability is that there is not sufficient proof to warrant its reception. The ante-natal causes which are acknowledged to produce blindness are the intermarriage of near relatives, scrofula, and syphilis; but congenital cases of blindness are not found to be so frequent as those of deafness. In intermarriage, and where the parents are imperfectly developed, there is liability to want of development of the nerves of special sense; but in most cases ante-natal as well as post-natal blindness is caused by imperfection or disease of the optical apparatus which is accessory to the nerves of special sense; or in other words, the defect generally exists in some part of the globe of the eye. Hereditary blindness is not frequent. Of 700 blind persons in the institutions at Philadelphia whose parentage is known, according to Mr. Chapin, the principal of the Pennsylvania institution for the blind, only 12 had either parent blind. An investigation which he made at the *hospice des Quinze Vingts*, Paris, revealed the remarkable fact that of the several hundred children born there of parents one or both of whom were blind, there was not one blind at birth. After birth the principal causes of blindness are: 1, special diseases, such as purulent ophthalmia, inflammation of the cornea and of the iris, cataract or opacity of the crystalline lens, and amaurosis or paralysis of the optic nerve; 2, general diseases, whose sequelæ attack different parts of the eye, as smallpox, scarlatina, measles, typhus fever and other inflammatory fevers, and scrofula; 3, injuries from blows or wounds, and from malpractice, the latter being one of the most fruitful causes. The following table exhibits the causes of the malady in nearly all the cases received in the Liverpool asylum for the blind from its foundation in 1791 to January, 1859:

CAUSES.	Totally.	Partially.	Whole Number.
Smallpox	202	49	251
Inflammation	278	48	326
Cataract	56	93	149
External injury	99	47	146
Defect of optic nerve	76	64	140
Amaurosis	25	15	40
Imperfect organization	6	14	20
After fever	14	5	19
Measles	8	5	13
Convulsions	3	3	6
Lost sight at sea	8	1	9
Gradual decay	5	3	8
Not mentioned	28	27	55

An examination of 500 cases from the Perkins institution for the blind at Boston gives the following percentage of causes: congenital, 37·75; disease after birth, 47·09; accidents, 15·16. The extraordinary exemption from blindness in the United States as compared with Great Britain and Ireland may be in a great measure attributed to the far less prevalence of smallpox in this country. Dr. Crompton of Manchester estimated that in Great Britain and Ireland more than 4,000 were blind from smallpox, out of a blind population of 28,450 in 1841. In the Glasgow asylum nearly one fifth were blind from smallpox. In the Pennsylvania institution, of 476 received up to 1863, only 21, or $\frac{1}{22}$ of the whole, lost their sight by that disease. In the Ohio institution, of 118 up to a certain date, only one was blind from this cause. Proceeding from temperate latitudes toward the equator, the proportion of blind to the entire population increases, but this is more noticeable in the eastern than in the western hemisphere. The glittering sand which reflects the light and heat of the sun,

and also the fine particles of dust that are blown into the eyes, are causes which are very fruitful in producing ophthalmia in northern Africa. Again, as we approach the polar regions, where snow and icebergs reflect the sun's rays, the proportion of the blind increases. The following table, taken from the work of a blind author, W. Hanks Levy ("Blindness and the Blind," London, 1872), of blind persons in England and Wales, shows the proportion as to sex, and the tendency of increase of years to produce loss of sight:

AGES.	Males.	Females.
Under 10 years	619	510
Between 10 and 20	896	675
" 20 " 30	936	632
" 30 " 40	1,057	673
" 40 " 50	1,323	836
" 50 " 60	1,291	1,054
" 60 " 70	1,611	1,601
" 70 " 80	1,674	1,866
" 80 " 90	770	1,064
" 90 " 100	63	138
Upward of 100	2	4
Total	10,247	9,103

This table exhibits a great preponderance in the proportion of the female over the male blind who are more than 60 years of age, and a preponderance of the males below that age. A comparison of the proportion of male to female blind in the United States does not show precisely the same results, as will be seen from the following table prepared from the census of 1870:

AGES.	Male.	Female.
Under one year	18	20
Between 1 and 5 years	126	115
" 5 " 10 "	367	299
" 10 " 20 "	1,218	1,155
" 20 " 30 "	1,078	831
" 30 " 40 "	1,109	643
" 40 " 50 "	1,292	688
" 50 " 60 "	1,256	746
" 60 " 70 "	1,330	988
" 70 " 80 "	1,143	1,097
" 80 " 90 "	534	618
" 90 " 100 "	98	131
Upward of 100 "	16	25
Total	9,610	7,326

It is thus seen that about half of the blind in the United States are over 48 years of age. In all countries the number of males among the blind exceeds that of females, the excess being mostly caused by accidents, to which the former are more exposed. It may be remarked that caution is required in forming conclusions from these tables. They have their value, but other facts must be weighed with them. One practical conclusion is gathered from the last table by Mr. Chapin of Philadelphia, which is that "if the adult blind were provided with instruction and employment in handicrafts in separate institutions, it would be practicable to receive and educate all the younger blind in the country over 10 years of age."—Observation would indicate that the blind as a class have less vitality than those who have their sight, and statistics confirm this opinion. This want of vitality is doubtless one cause of blindness; but again, much of their want of vitality is in consequence of their being blind, which causes them to lead more sedentary lives than they otherwise would. As Dr. Howe remarks, "There are many who are not born blind, who are born to become blind." From statistics embraced in a report of the Boston institution, gathered from seven American state institutions, the director makes the following note: "Of the number of persons admitted to the above-mentioned institutions between the ages of 10 and 14, the number that was surviving in 1859 was 8·6 per cent. less, according to the Massachusetts life table, than the number that should then be surviving. Of the number admitted during the three years of 1838–'40, from which the average time elapsing to the middle of 1859 was 20 years, the number that survived in 1859 was 12·3 per cent. less than the number that should have survived."—The number of blind in the world cannot be stated with any great degree of exactness. In the United States and in most of the countries of Europe, however, the number is known from census returns. In other countries the number has been estimated by various travellers and writers, and from a comparison of data it is believed that a pretty near approximation has been reached. The table on the next page, compiled from the United States census of 1870, contains a considerably larger number than was shown by that of 1860, giving reason to believe that the latter census was imperfect. The following is a table of the blind in Europe, the number in Russia, Austria, Spain, Portugal, Italy, Greece, and Turkey in Europe being estimated; but the attention given to the subject in most of these countries makes it probable that the estimates are pretty nearly correct:

COUNTRIES.	Population.	No. of blind.	Proportion.
England and Wales	20,070,000	19,352	1 to 1,037
Scotland	3,060,000	2,820	1 " 1,086
Ireland	5,800,000	6,879	1 " 843
Russia in Europe	64,000,000	70,000	1 " 900
Sweden	3,640,000	2,536	1 " 1,419
Norway	1,490,000	2,759	1 " 540
Denmark	1,800,000	1,200	1 " 1,523
Germany	43,000,000	26 500	1 " 1,620
Austria	33,000,000	33,000	1 " 1,000
Switzerland	2,510,000	1,790	1 " 1,400
Holland	3,309,000	1,990	1 " 1,663
Belgium	4,530,000	3,675	1 " 1,233
France	38,000,000	40,500	1 " 938
Spain	16,000,000	20,000	1 " 800
Portugal	3,600,000	4,500	1 " 800
Greece and Ionian Isles	1,500,000	1,900	1 " 809
Turkey in Europe	13,000,000	16,250	1 " 809
Total	258,309,000	255,633	

The above computation gives as the average proportion of the blind to the whole of the population of Europe, 1 in 1,094. It has been estimated that in China alone, with a population of about 400,000,000, there are at least 1,000,000 blind persons, and that there are in India more than 350,000. These estimates are made

TABLE OF THE BLIND OF ALL CLASSES IN THE UNITED STATES AND TERRITORIES.

STATES.	Aggregate of all classes.	BORN IN THE UNITED STATES.											FOREIGN BORN.			Total population.
		White.		Black.		Mulatto.		Indian.		Total.		Aggregate of native born.	Male.	Female.	Aggregate of foreign born.	
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.					
Alabama	611	187	153	137	96	13	10	...	...	337	259	596	7	8	15	996,992
Arkansas	333	130	137	32	23	3	3	...	1	165	164	329	1	3	4	484.471
California	179	67	41	...	2	...	1	3	...	70	44	114	50	15	65	560.247
Connecticut	252	114	94	4	2	4	...	...	...	122	96	218	16	18	34	537,454
Delaware	68	10	22	9	16	...	1	...	...	19	39	58	7	3	10	125,015
Florida	88	20	12	17	27	3	1	...	...	40	40	80	5	3	8	187,748
Georgia	740	213	198	155	145	2	11	...	...	370	354	724	6	10	16	1,184.109
Illinois	1,042	440	332	3	4	1	...	...	...	444	336	780	155	107	262	2,539,891
Indiana	991	450	409	13	7	5	2	...	...	464	418	886	73	32	105	1,680.637
Iowa	465	200	166	1	2	...	...	...	...	201	168	369	67	29	96	1,194,020
Kansas	128	48	46	12	9	2	1	2	...	64	56	120	5	3	8	364,399
Kentucky	978	386	356	83	79	19	17	1	...	489	452	941	26	11	37	1,321,011
Louisiana	447	91	44	126	89	14	23	...	...	231	156	387	31	29	60	726.915
Maine	324	184	112	...	...	1	...	...	...	185	112	297	22	5	27	626,915
Maryland	427	140	125	42	48	5	8	...	...	187	181	368	32	27	59	780,894
Massachusetts	761	289	242	7	3	2	4	...	...	298	249	547	134	80	214	1,457,351
Michigan	418	167	111	...	2	3	1	7	4	177	118	295	85	38	123	1,184.059
Minnesota	103	35	26	...	...	...	...	...	...	35	26	61	24	18	42	439,706
Mississippi	474	118	190	119	118	11	8	...	2	248	218	466	6	2	8	827.922
Missouri	904	377	296	41	54	4	7	...	...	422	357	779	81	44	125	1,721,295
Nebraska	22	9	9	...	...	...	...	...	...	9	9	18	3	1	4	122,933
Nevada	4	1	2	...	...	...	...	...	...	1	2	3	1	...	1	42,491
New Hampshire	206	104	79	...	3	...	...	...	...	104	82	186	14	6	20	318.300
New Jersey	317	119	102	12	12	...	2	...	...	131	116	247	47	23	70	906,096
New York	2,213	814	605	22	22	...	...	...	1	836	628	1,464	459	290	749	4,382,759
North Carolina	835	269	269	146	118	12	14	...	3	427	404	831	2	2	4	1,071,361
Ohio	1,366	587	463	20	17	6	4	...	...	613	489	1,102	159	105	264	2,665,260
Oregon	35	18	9	1	...	...	...	...	...	19	9	28	4	3	7	90,923
Pennsylvania	1,767	715	577	17	19	7	2	...	...	739	598	1,337	283	147	430	3,521,951
Rhode Island	121	50	33	3	2	...	2	...	...	53	42	95	13	13	26	217,353
South Carolina	451	88	91	128	112	6	9	...	...	222	212	434	10	7	17	705,606
Tennessee	876	342	308	77	109	14	10	...	...	433	427	860	11	5	16	1,258,520
Texas	434	134	94	58	52	9	6	1	...	202	152	354	27	23	50	818 579
Vermont	189	107	74	...	...	...	...	...	...	107	54	161	16	12	28	330,551
Virginia	895	254	212	175	192	8	34	...	...	437	488	875	18	2	20	1,225,163
West Virginia	163	73	59	5	13	3	...	...	...	81	72	153	14	1	15	442,014
Wisconsin	409	123	79	...	...	...	...	...	...	128	79	207	121	81	202	1,054,670
Total States	20,041	7,478	6,067	1,465	1,397	157	181	14	11	9,114	7,656	16,770	2,035	1,206	3,241	38,115,641
TERRITORIES.																
Arizona	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	9,658
Colorado	26	16	8	...	...	...	...	...	...	16	8	24	2	...	2	89.864
Dakota	5	2	2	...	...	...	...	...	...	2	2	4	1	...	1	14,181
Dist. of Columbia	78	10	5	23	21	8	6	...	...	41	32	73	2	3	5	131.700
Idaho	4	1	2	...	...	...	...	...	...	1	2	3	1	...	1	14 999
Montana	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20,595
New Mexico	159	99	58	...	...	...	...	...	2	99	55	154	5	...	5	91,874
Utah	29	5	4	...	...	...	...	...	...	5	4	9	12	8	20	86,786
Washington	5	3	1	...	...	...	...	...	...	3	1	4	1	...	1	23,955
Wyoming	2	2	...	...	...	...	...	...	...	2	...	2	...	...	...	9,118
Total Territories	309	138	75	23	21	8	6	...	2	169	104	273	25	11	36	442,780
Aggregate	20,320	7,616	6,142	1,488	1,418	165	187	14	13	9,283	7,760	17,043	2,060	1,217	3,277	38,558,371

from the statements of travellers in regard to the proportion of the blind seen by them. Mr. Levy, after much thought and inquiry, thinks the following numbers for Asia not too great, and he is probably correct:

COUNTRIES.	Population.	No. of blind.	Proportion.
Turkey in Asia	17,000,000	28,000	1 to 600
Arabia	10,000,000	25,000	1 " 400
Russia in Asia	10,000,000	12,500	1 " 800
Tartary	4,000,000	6,600	1 " 600
Afghanistan	5,000,000	8,300	1 " 600
Persia	10,000,000	16,500	1 " 600
India	177,000,000	354,000	1 " 500
China	410,000,000	1,025,000	1 " 400
Japan	50,000,000	125,000	1 " 400
Dutch East Indies	16,354,000	55,000	1 " 300
Siam and Anam	12,000,000	15,000	1 " 400
Philippine Islands	5,000,000	12,500	1 " 400
Total	726,354,000	1,683,400	

This computation makes the proportion of the blind to the whole population in Asia 1 in 500. It is computed that Africa, with a population of 75,000,000, has about 1 blind to every 300 of the whole number, or a total number of 250,000 blind. The number of blind in other countries is estimated as follows:

COUNTRIES.	Population.	No. of blind.	Proportion.
British North America	2,663,000	1,568	1 to 1,692
Mexico	7,200,000	4,800	1 " 1,500
West Indies	3 855 000	6,258	1 " 616
Central and S. America	20,000,000	25,000	1 " 800
Australia and Polynesia	3,000,000	3,750	1 " 800
Total	36,718,000	41,376	

It appears, therefore, that the total number of persons now living who are without sight is

over two and a quarter millions. From the accounts of travellers it would seem that in Japan the blind receive more respect than in other Asiatic countries. Sir Rutherford Alcock, in his "Capital of the Tycoon," says: "There are two sects of blind, founded by two great celebrities in Japanese history—one by the third son of a mikado who wept himself blind for the death of a mistress, and the other by a defeated general in the civil wars, who tore his eyes out that he might not be provoked to take the life of a generous victor, Youtomo, the founder of a dynasty. Into these two sects, half secular, half religious, persons of all ranks enter. They are generally but not exclusively musicians, and earn their subsistence by playing on musical instruments."—*Care and Education of the Blind.* Although in all ages individuals among the blind have obtained some education, the ancients made no provision for the support or instruction of these unfortunates, who depended for subsistence upon their friends, or lived by begging; and long after the commencement of the Christian era they received but little of the sympathy which the doctrines of Christianity inculcate. The first known public asylum for the blind was founded at Paris in 1260 by Louis IX., or Saint Louis, and was called the *hospice des Quinze Vingts.* It was established for the benefit of soldiers who were suffering from ophthalmia contracted in the campaigns in Egypt, and was intended, as its name implies, for 15 score or 300 blind persons, although for many years the number has been much larger. Its annual income is about $80,000. The allowance to each blind man is $89 per annum; if he is married, it is increased to $110; and if he has children, he receives an additional $10 for each child. It has also about 600 pensioners who do not reside at the hospital, but receive, according to their age and circumstances, a yearly sum of $20, $30, or $40, to aid in their support. Some of those entitled to a residence in the hospital prefer to remain with their families in other parts of the city, and to them a pension of $50 per annum is paid. No instruction is given to the inmates of the Quinze Vingts, but some of them execute pieces of work which are remarkable for taste and ingenuity. A similar but less extensive institution was established at Chartres in the latter part of the 13th century, and endowed by King John in 1350 to enable it to accommodate 120 blind persons. From a variety of causes the number of inmates dwindled till in 1837, according to Dufau, there were but 10. It is now closed.—During the 16th century benevolent men who had witnessed with sympathy the sad fate of the blind devised processes for their instruction, but with no great success. In 1670 Padre Lana Terzi, a Jesuit of Brescia, who had already published an essay on the instruction of deaf mutes, produced a treatise on the instruction of the blind. Nearly a century later the abbé Deschamps and Diderot proposed plans for their instruction in reading and writing; but it was not till 1784, when Valentin Haüy commenced his labors, that any institution specially intended for the education of the blind was successfully attempted. Attracted at first to humanitarian labors by the brilliant example of the abbé de l'Épée in behalf of the deaf and dumb, he enthusiastically devoted himself to the work of instructing the blind. About this time he became acquainted with the celebrated Theresa von Paradis, the blind pianist, and received great encouragement from the interest she took in his enterprise. His first pupil was a young blind beggar named Leseur, who afterward became instrumental in promoting the education of the blind, as Massieu had been in that of deaf mutes. He taught him to distinguish raised letters, arithmetical figures, and outline maps, and in a few weeks exhibited him before the members of the *société philanthropique*, who were enthusiastic in their admiration. A small house, No. 18 Notre Dame des Victoires, was secured, with funds to support 12 pupils. During the year the number increased to 24, and, in consequence of his unceasing labors, improved so rapidly that he exhibited them before Louis XVI. and the court. Haüy became a lion, and the school increased in numbers and popularity. Many of its pupils became proficients in music and mathematics. In 1791 the school was taken under the patronage of the state, but the sums decreed for its support were paid only in assignats, which soon became worthless. Haüy and his blind pupils worked at the printing press procured in their more fortunate days, and eked out an existence by the severest toil. After the establishment of the empire the school was transferred to the Quinze Vingts, where its members became demoralized from associating with the inmates of that institution, Haüy resigned, but received a pension of 2,000 francs. In 1806 he visited St. Petersburg at the invitation of the emperor Alexander I., and founded the institution for the blind in that city. He was also instrumental in founding the institution for the blind at Berlin about the same time. In 1814 the French government assigned the school of Haüy separate quarters in the rue St. Victor, and gave it ampler funds and the title of "Royal Institution for the Blind." Dr. Guille was appointed director, a man of energy and tact, but excessively vain and jealous of the fame of Haüy. After some difficulty he resigned and was succeeded by M. Dufau, who had been for 25 years a teacher in the institution. The next institution of the kind in point of time was founded at Liverpool in 1791, and in 1793 asylums for the blind were established at Edinburgh and Bristol. A list of the various institutions for the blind in Great Britain, Ireland, and Scotland is given in the following table, compiled from the "Guide to the Institutions and Charities for the Blind in the United Kingdom," by Mansfield Turner and William Harris (London, 1871):

TABLE OF INSTITUTIONS FOR THE BLIND IN GREAT BRITAIN AND IRELAND.

NAME OF INSTITUTION.	When founded.	No. of pupils.
School for the Blind, Liverpool	1791	67
Catholic Blind Asylum, Liverpool	1841	44
School for the Blind, St. George's Fields, London	1799	160
Society for Teaching the Blind, St. John's Wood, London,	1838	56
Alexandra Institute, Oxford street, London	1863	20
Henshaw's Blind Asylum, Manchester	1827	84
Royal Victoria Asylum, Newcastle	1838	44
Institute for the Blind, Bath	1850	9
Blind School Home, Bath	1857	12
Institute for the Blind, Birmingham	1845	75
Asylum for the Blind, Brighton	1842	50
Asylum for the Blind, Bristol	1793	46
West of England Institute, Exeter	1838	47
Institute for Indigent Blind, Norwich	1805	80
Midland Institution for the Blind, Nottingham	1844	54
Yorkshire School for the Blind, York	1833	71
Asylum for Industrious Blind, Edinburgh	1793	29
School for Blind Children, Edinburgh	1836	34
Asylum for the Blind, Aberdeen	1812	12
Asylum for the Blind, Glasgow	1827	42
Richmond National Institution, Dublin	1810	20
Molyneaux Asylum for the Blind, Dublin	1815	60
Ulster Society for Deaf, Dumb, and Blind, Belfast	1831	88
Asylum for the Blind, Cork	1840	82
Total		1,176

In London 23 institutions for the benefit of the blind have been established by donations and bequests. Of these the following are the principal: West's charity for the blind, to grant pensions of £5 to blind persons over 50 years of age, was founded in 1718. It assists 331 persons, the annuities amounting to £1,655. Hetherington's charity for the aged blind empowers the governors of Christ's hospital to pay annuities of £10 to blind persons "who have seen better days," and who are over 60 years of age. The income from the endowment is £7,522, and from legacies and donations in 1870 there was £2,100, making a sum of £9,622, which, after deducting certain payments to Christ's hospital, is distributed among 695 blind people. The painters' and stainers' company's charities for the blind give pensions of £10 each to blind persons over 60 years of age, granted under the wills of five persons (four of them women) dated from 1780 to 1808. The sum invested is £65,375. Came's charity distributed pensions of £5 each to 110 blind persons in 1870. The Christian blind relief society distributes about £1,000 annually among 200 blind from donations and legacies. The blind men's friend, or Day's charity, founded by the late Mr. Charles Day, grants pensions of £12, £16, and £20 to deserving blind persons; the number so benefited in 1870 was 237. The indigent blind visiting society, founded in 1834, distributes £1,530 in instructing and otherwise aiding the blind. The Jews' society distributes £1,000 annually, paying 8*s.* per week each to indigent blind Jews.—Reading is taught in various kinds of type, those of Alston (Roman), Lucas (stenographic), and Moon predominating in Great Britain. The institutions in England are all connected with the English church, with the exception of the Roman Catholic school at Liverpool, but there is no exclusion on account of creed. Generally persons are only admitted from certain localities, specified in the title of the institution. The schools are mostly supported by donations, annual subscriptions, and legacies; and in general the friends or parishes of the pupils pay about £10 per annum toward their maintenance. The school for the indigent blind, St. George's Fields, however, boards, clothes, and educates 160 blind persons without cost to their friends for a period of six years. The education given in most of the schools in the United Kingdom consists in religious training and instruction in reading, writing, arithmetic, history, geography, and music, and to a great extent the arts of making baskets, brushes, matting, and mattresses, knitting, netting, &c.—The information contained in the following notice of European blind institutions is chiefly derived from *Die Fürsorge für die Blinden*, by Herr Pablasek, director of the imperial institution for the blind at Vienna, and from the work of Mr. W. Hanks Levy, before cited. France has 13 schools for the blind and one asylum, the *hospice des Quinze Vingts*. Of the schools there is one at Paris, the old school of Haüy, and one at each of the following places: Lyons, Chamelière, Arras, Lille, Fives, Nancy, Montpellier, Rhodez, St. Médard-les-Soissons, St. Hippolite-du-Fort, Vienne, and Marseilles. All these schools, however, afford aid to only a small number compared to those in the United States. Braille's system of reading and writing, and of musical notation, is generally adopted. Instruction in tuning the pianoforte receives a good deal of attention, and it is said that there are in France about 200 blind organists holding situations. The general education is not very thorough, but the branches pursued are nearly the same as in Great Britain. The industrial employments of basket making, chair bottoming, knitting, and the making of list shoes are generally adopted; and at Nancy the art of turning is carried on to a considerable extent, some of the workmen earning 5 francs a day. The first institution for the blind in Germany was the one commenced at Berlin by Valentin Haüy in 1806, Herr Zeune, the inventor of relief maps, being appointed the director. The example was followed by Dresden in 1809, by Königsberg in 1818, and by Breslau in 1819. There are also institutions for the blind at each of the following towns: Gmünd, Munich, Nuremberg, Würzburg, Freiburg, Stuttgart, Bruchsal, Brunswick, Halle, Mannheim, Magdeburg, Posen, Wollstein, Düren, Soest, Kiel, Hanover, Weimar, Hamburg, Leipsic, Friedberg, Metz, Wittstock, Paderborn, Barby, Wiesbaden, Illzach, Ellwangen, and Frankfort-on-the Main. There is also a primary school for children at Berlin, and one at Hubertsburg. In these 33 institutions the reading is principally in the raised type of the Roman alphabet. The Bible society of Stutt-

gart has contributed largely to the printing of the embossed German Bible, the greater part of which was printed at Illzach. The cultivation of music is characteristic of the German institutions. The industrial employments are basket making, reseating chairs, making list shoes, brush making, netting, and knitting. Rope making is carried on at Hanover and turning at Munich. In Germany it is usual for the sexes to occupy opposite wings in the same institution, while in France they occupy buildings in different parts of the city. The institution at Breslau was founded and managed for nearly half a century by Herr Knie, who was born blind; and the present director of the institution at Kiel, Herr Simonon, is also blind. Austria has six educational institutions and two asylums and industrial establishments. Of the former there is one in each of the following cities: Vienna, Prague, Linz, Pesth, Brünn, and Lemberg; and of the latter one is at Vienna and one at Prague. The first institution for the blind in Austria was founded in 1804 by the celebrated Dr. Klein, who was its director for about half a century. The embossed Roman type in capitals and small letters is employed in the Austrian institutions, and pricking letters in paper is practised in writing. Music is cultivated with reference to earning a livelihood, and the industrial employments are similar to those in Germany. Russia has four institutions for the blind: one at St. Petersburg, established by Haüy in 1806; one at Warsaw, established in 1825; one at Helsingfors, the capital of Finland; and one at Gatchina, a small town about 30 m. from St. Petersburg. The education and industrial employments are similar to those in Germany, music receiving much attention. Sweden has a blind institution at Stockholm, founded in 1806, and one at Gothenburg. The Roman and Moon's types are used in reading, and the employments are principally basket making and knitting. Norway has lately established an institution for the blind at Christiania. In 1811 a school for the blind was established at Copenhagen by the "Society of the Chain," an organization similar to that of the freemasons, and continued under their management till 1857, when it was taken under the care of the state and called the "Royal Institution for the Blind." Herr Moldenhawer was appointed director, and a sum of $2,000 per annum allowed from the royal treasury, the society of the chain endowing it with $8,000. Denmark has also an industrial institution for adults at Copenhagen, established in 1862, on the plan of the London association. The common alphabet is employed in reading, and they have a contrivance for pencil writing and for embossing letters by hand. In Iceland, which belongs to Denmark, it is said the proportion of blind to the whole population is about 1 in 300. Holland has institutions for the blind at Amsterdam (founded in 1808), Groningen, Rotterdam, Utrecht, the Hague, and one in North Brabant. The common Roman type and also Braille's and Moon's characters are used in reading. Music and the trades receive about the same attention as in Germany and England. The blind in Holland are entirely supported by voluntary subscription. In Belgium an asylum for the blind is said to have been established at Bruges in 1305 by Robert de Béthune, in gratitude for the courage displayed by the inhabitants of that town in repelling an invasion of Philip the Fair in 1300. A similar asylum was established at Ghent by Peter Vander Leyen about 1370. Both of these have passed away, although the house of worship which was connected with the one at Bruges is said to still exist. The first school for the blind in Belgium was established at Brussels in 1833. There is also another institution for the blind in that city, two at Ghent, and one each at Bruges, Ypres, Mons, Antwerp, and Liége. Braille's system of reading and writing is used in all these schools except the one at Bruges, where a modified system by the director, the abbé Carton, who died in 1863, is employed. The industrial arts are basket making, bottoming chairs, and knitting, and at Bruges the making of bead rosaries. The deaf and dumb share in common with the blind the institutions in Belgium, which are supported by the state. The first institution for the blind in Switzerland was established at Zürich in 1809. There are also an educational and industrial institute at Bern, a combined school and hospital at Lausanne, an asylum and industrial institution at Schaffhausen, and one at Fribourg. At these institutions, with the exception of the one at Lausanne, the Roman type is employed, but at the latter place Braille's system is in use. The principal industrial occupation of the blind in Switzerland is wood turning. At Lausanne there is a young man named Edward Meister, a turner, who is deaf, dumb, and blind. Much cannot be said of the institutions for the blind in Italy. Pablasek mentions four as existing at Palermo, Naples, Milan, and Padua; but they do not appear to be in a well organized condition. To the credit of Italy, however, it may be stated that the first book ever published on the condition of the blind was written by an Italian and printed in Italian and French in 1646, called *Il cieco afflitto e consolato*, or *L'Aveugle affligé et consolé*, being a letter from S. D. C. to Vincent Armanni. In Spain there are two institutions for the blind, one at Madrid and one at Barcelona. They are not in a prosperous condition, although the number of blind in Spain would seem to be great enough to stimulate the government to take some active measures for their relief. An institution for the blind was commenced at Rio de Janeiro in 1854, by the efforts of a blind gentleman, José Alvares de Alevedo, who was educated at the Paris institution. He did not live to see his plans carried out, having died the same year; but the school now exists, with about 30 pupils. In Asiatic Turkey, Mr. Mott of Beyrout has

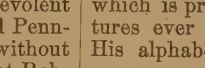
had parts of the Bible embossed in Arabic in Moon's type. Some of the American and English residents in China are also doing something toward aiding and instructing the blind in some of the seaports.—The following table presents a list of the institutions for the blind in the United States in 1870, prepared by Dr. Howe, director of the Perkins institute for the blind at Boston, for the bureau of education at Washington. The facts exhibited by it show that more attention is bestowed upon the care and education of the blind in this country than in any other. While only five of these institutions were commenced before 1840, it will be observed that more than 6,000 blind persons have been under their care and instruction, a proportion considerably greater than obtains in Great Britain, and vastly greater than in most of the countries on the continent of Europe.

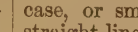
INSTITUTIONS FOR THE BLIND IN THE UNITED STATES.

NAME.	LOCATION.	Year of formation.	Total No. admitted since opening.	Present number.	No. of instructors and other employees.	No. of blind employees.	Total amount paid to the employees.	Superintendent.
Perkins Inst. and Mass. Asylum for the Blind	Boston, Mass.	1829	776	163	40	13	$3,655	Samuel G. Howe.
New York Institution for the Blind	New York city.	1831	1,001	159	51	9	2,500	Wm. B. Waite.
Institution for the Blind	Philadelphia.	1833	751	186	60	24	3,300	Wm. Chapin.
Institution for the Blind	Columbus, O.	1837	732	103	30	4	1,116	G. L. Smead.
Institution for Deaf, Dumb, and Blind	Staunton, Va.	1839	545	137	.....	2	420	Chas. D. McCoy.
Institution for the Blind	Louisville, Ky.	1842	277	29	18	7	1,500	B. B. Huntoon.
Institution for the Blind	Nashville, Tenn.	1844	123	41	8½	4	1,920	J. M. Sturtevant.
Institution for the Blind	Raleigh, N. C.	1846	113	62	.....	3	1,100	S. F. Tomlinson.
Institution for the Blind	Indianapolis, Ind.	1847	431	106	25	6	3,910	W. H. Churchman
Institution for the Blind	Jacksonville, Ill.	1849	394	70	17	none	.....	Joshua Rhoads.
Institution for the Blind	Janesville, Wis.	1850	173	69	7	1	455	Thos. H. Little.
Institution for the Blind	St. Louis, Mo.	1851	.....	85	7	.....	.....	H. R. Foster.
Louisiana Inst. for instruction of the Blind	Baton Rouge, La.	1852	23	23	9	1	1,000	P. Lane.
Institution for the Blind	Baltimore, Md.	1853	124	50	14	2	100	F. D. Morrison.
Institution for the Blind	Jackson, Miss.	1853	244	108	28	9	1,580	Sarah B. Merrill.
Institution for the Blind	Vinton, Iowa.	1853	.....	105	8	2	.....	G. A. Knapp.
Academy for the Blind	Macon, Ga.	1853	.....	33	.....	.....	.....	W. D. Williams.
Institution for the Blind	Austin, Texas.	1856	.....	15	.....	1	150	R. M. Mills.
Institution for the Deaf, Dumb, and Blind	Flint, Mich.	1854	354	181	.....	.....	.....	Egbert L. Bangs.
Institution for the Deaf, Dumb, and Blind	Talladega, Ala.	1858	.....	14	2	.....	.....	Jos. H. Johnson.
Institution for the Blind	Little Rock, Ark.	1859	87	40	11	3	2,456	Otis Patten.
Minnesota Inst. for Deaf, Dumb, and Blind	Faribault, Minn.	1863	83	66	.....	.....	.....	J. L. Noyes.
Institution for Deaf, Dumb, and Blind	Oakland, Cal.	1866	66	83	19	1	1,350	W. Wilkinson.
Kansas Institution for the Blind	Wyandotte, Kan.	1867	.....	23	15	.....	.....	W. W. Updegraff.
New York State Institution for the Blind	Batavia, N. Y.	1867	166	121	27	2	400	A. D. Lord.
Institution for Deaf, Dumb, and Blind	Ced'r Springs, S.C.	1869	.....	14	3	1	.....	J. M. Hughston.
Institution for Deaf, Dumb, and Blind	Romney, W. Va.	1870	13	11	3	1	455	H. H. Hollister.
Total				2,018				

The following early history of the institution for the blind at Boston is condensed from a report of its trustees. Through the exertions of Dr. John D. Fisher an association of gentlemen was formed in that city in the year 1829 for the purpose of founding an institution for the blind, and an act of incorporation was procured under the name of the "New England Asylum for the Blind." Owing to the time occupied in collecting information, it was not opened till 1832, and then with six pupils in a private house in Pleasant street, Boston. Dr. Samuel Gridley Howe took charge of the institution as director, and under his able management it has flourished to this day. Col. Thomas Handasyd Perkins gave it his mansion in Pearl street, which was exchanged in 1839 for the Mount Washington hotel in South Boston, where it has remained ever since. Mr. William Oliver made a still more munificent donation, and other gentlemen contributed liberally. The Massachusetts institution has from the first aimed to give the blind an education which should fit them for any position in life compatible with their infirmity. The education of the celebrated blind, deaf, and dumb girl Laura Bridgman in this institution, who was born the year it was founded, forms an interesting portion of its history. Some of the institutions in the United States are legally private incorporations; whether receiving aid from the state or not, the latter has no control in the management, which is held by a board of trustees. Such is the case with the New York institution for the blind, in New York city. Others are purely state institutions, and others still are mixed, the property being held by a corporation, and the state appointing a certain number of trustees. The Boston institution is of the latter character. Dr. Howe, in his communication to the commissioners of education, says: "In 1831 Dr. Akerly of New York city, who had been active in introducing instruction for deaf mutes, interested himself and others in procuring like benefits for the blind. Some children were taken from the almshouse and instructed by way of experiment in a small room in Canal street by Dr. John D. Russ, who raised the infant institution to maturity; and though he long since ceased to superintend it

officially, he has not yet ceased to be its efficient friend. The first thought of building up special institutions for the instruction of the blind seems to have occurred to benevolent persons in New England, New York, and Pennsylvania almost simultaneously, but without concert. In Philadelphia, the benevolent Roberts Vaux had been urging the matter for several years upon his friends in that city before they finally organized the excellent institution which has grown to be among the foremost in the world. The success of these institutions awakened an interest all over the United States. A detachment of pupils from the Perkins institute visited 17 states and were exhibited before the legislatures and people." The course of instruction in all the institutions for the blind in this country embraces nearly the same studies, and is of necessity chiefly oral. The primary instruction for the young is in spelling, reading, moral lessons, and arithmetic; afterward come geography, arithmetic, history, grammar, writing, physiology, algebra, geometry, natural philosophy, mental philosophy, science of government, logic, chemistry, and moral philosophy. Conversation, reading, writing, and music are of course continually practised, and many of the pupils become adepts in the last named art, as they do in all parts of the world.—*Printing for the Blind.* Attempts were made in the 16th century to print for the blind in intaglio, and afterward experiments were made with raised letters made to slide in grooves. In 1640 Pierre Moreau, a Paris notary, undertook to cast movable leaden letters, but the plan was not successful. In 1780 Weissenburg, a blind man of Mannheim, made geographical maps in relief; and several blind Germans adopted the device of forming letters with pins in cushions. It is said that when Theresa von Paradis of Vienna returned to Paris from England in 1784, she represented musical notes with pins upon a cushion, and that from this her friend Haüy conceived the idea of embossing letters on stiff paper. As Mlle. von Paradis also possessed the contrivances of Weissenburg and of Von Kempelen, it is probable that Haüy derived quite as many suggestions from them. It is generally stated that the first book in relief printing was Haüy's *Essai sur l'éducation des aveugles* (Paris, 1786), which was translated into English by Dr. Thomas Blacklock, the blind poet. It appears, however, from the "Annual Register" for 1762, that Mlle. Salignac, a blind lady, received communications from her friends written by pricking the letters in paper with a pin, and Diderot says that Priault printed some books for her. Printing for the blind had been introduced in France for 43 years, and in Prussia 23 years, before it was used in England, although the mechanical arts were taught to the blind in Liverpool only seven years after the practice was commenced at Paris. James Gall of Edinburgh printed in 1827 the first book in English in relief for the blind. Mr. Gall visited London in 1829, and introduced his printing in that city. About 1832 he completed at Edinburgh the Gospel of St. John, which is probably the first book of the Scriptures ever printed for the use of the blind. His alphabet is the common English lower case, or small letter, reduced to angles and straight lines, as follows:



Numerals. 

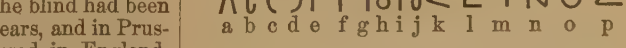
In 1832 the society of arts in Scotland offered a gold medal, of the value of 20 sovereigns, for the best alphabet and method of printing for the blind. Twenty-one alphabets were submitted to the committee, 14 of which were for competition. Of these only four have survived. The one which obtained the medal was that of Dr. Fry, which, with slight modifications made by Mr. Alston, the treasurer of the asylum for the blind in Glasgow, are simply the Roman capitals very slightly altered, and nearly the same as those which have been until recently used at Philadelphia. One of the alphabets submitted to the committee was composed of stenographic characters, invented by Mr. T. M. Lucas of Bristol, as follows:

a b c d e f g h i j k l m n

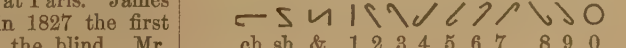
o p q r s t u v w x y z

Numerals.
1 2 3 4 5 6 7 8 9 0
ll ss ff th sh ph ch ng wh gh &

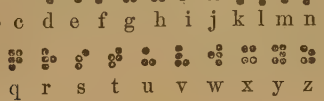
This alphabet is principally used only in three of the schools in England, and partially in three others. It is said to be difficult. A few years later a phonetic alphabet was introduced by Mr. Frere, which is now taught only at Norwich. Mr. Levy remarks that "it is useful in enabling persons entirely uneducated to learn to read in a short space of time, but that it tends very much to vitiate pronunciation." Mr. Moon, who had been engaged in teaching Frere's system at Brighton, printed in 1847 a book in the following characters, which are exclusively used in one school in London, one in Brighton, one in Edinburgh, one in Aberdeen, one in Dublin, and one in Cork:


a b c d e f g h i j k l m n o p

q r s t u v w x y z


ch sh & 1 2 3 4 5 6 7 8 9 0

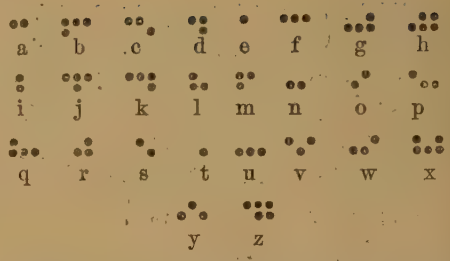
The following is the alphabet in the system of tangible point printing which was introduced about the year 1839 at the imperial institution for the blind in Paris by the late M. Braille:



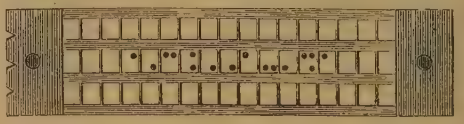
This system is used in the schools in France, at Lausanne in Switzerland, at some of the schools in Belgium and Holland, and at Rio Janeiro. The modification of this alphabet by the abbé Carton consists principally in changing the points so as to make the characters have some resemblance to the Roman letter, but it has never been adopted except at the school in Bruges, where it was introduced by its author. Printing in relief for the blind in the United States was begun at Boston by Dr. Howe in 1834, and at Philadelphia by Mr. Friedlander in 1835. Dr. Howe's alphabet consists of the following alteration of the lower case Roman type:

abcdefghijklmnopq
rstuvwxyz.

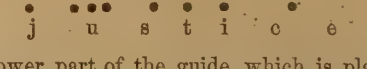
The Acts of the Apostles was printed in this type in 1834, and in 1836 the New Testament was printed in four volumes and sold for one dollar a volume. This was the first New Testament printed for the blind in any language. The Old Testament was completed in 1842. In all, there have been about 50 different works printed in this type at the Perkins institute, among which are Lardner's "Universal History," Howe's "Geography," Howe's "Atlas of the Islands," Peirce's "Geometry" with diagrams, "Astronomical Dictionary," Guyot's "Geography," "Pilgrim's Progress," "Milton's Poetical Works," "The Old Curiosity Shop," &c. The alphabet introduced into the Pennsylvania institution by Mr. Friedlander is similar to those of Fry and Alston, and to the Roman used in many of the schools on the continent of Europe, nearly like the black type called Gothic— A, B, C, D, 1, 2, 3, 4, &c. In this type the Pennsylvania institution has published portions of the Bible; "Dictionary of the English Language," 3 vols.; "Select Library," 5 vols.; "Student's Magazine," 4 vols.; "Church Music, with Hymns," the musical characters in relief, 3 vols.; *Die Ostereier* (German); and several other books. It has lately been decided, however, to adopt the type of Dr. Howe, which is the principal reading type now in use in all the institutions in the United States. A system of tangible point writing and printing has lately been devised by Mr. William B. Wait, the superintendent of the New York institution for the blind, in which the letters that occur oftenest are represented by the fewest points. The following is the alphabet:



An alphabet of capital letters is formed from these, but it is not proposed to use it much, except in cases where it would be obviously preferable. There are signs for words and combinations which occur often, as *the*, *and*, *of*, &c. An instrument called a guide, similar to the one used by M. Braille, but differing in some important respects, is used in the formation of the letters, which are made by pressing the point of a blunt style upon paper which is held upon a frame between the two parts of the guide. The upper part of the guide is represented in the subjoined cut, in which the word



"justice" is spelled, as will be observed, from right to left, in which manner all relief printing must be done. When the paper is turned over and the ends reversed, the raised points which are made by the style will appear as follows:



The lower part of the guide, which is placed beneath the paper, has six parallel grooves, two for each row of cells, for the purpose of forming the upper and lower lines of points. The cells and bars in the upper part of the guide are made of such dimensions that when a style of the proper size is used, the points formed in each of the angles of the cells will be equidistant; therefore spaces of any desired length may be left between the letters, any letter being formed entirely in one cell, or partly in one and partly in the next; the bars not being intended for separating the letters, but for locating the points. In regard to the respective merits of the systems of printing for the blind, there has been considerable controversy. Mr. Levy, the blind author, says: "In considering the best means for enabling the blind to read, it is necessary to fully comprehend the powers of touch as enjoyed by the person for whom the means of reading are especially intended.... The great error that has prevailed ever since the invention of raised letters is the supposition that the sense of touch exists with equal intensity in all blind persons, and that

to render this apparent the due cultivation of the sense of feeling is all that is required. Touch differs from sight in many respects, but chiefly in this, that while sight can take in at one glance many objects included within a vast area, touch can only convey to the brain by one act of contact the impression of the first small point that arrests its progress. Let a small horizontal line be made on a piece of paper, the person who wishes to feel it proceeds from the left side of the paper quite unconscious of what may meet his finger; he presently comes in contact with a point, which fact with more than lightning speed is conveyed to the brain. Now it is obvious that if it were possible to convey to the brain a distinct idea of one special letter or word every time the finger comes in contact with a point, 'tangible' reading would reach perfection. The first thing is to select the most tangible characters, viz., those whose properties can be perceived immediately that the finger comes in contact with them." On the other hand, the Rev. Mr. Johns, chaplain to the asylum for the blind, St. George's Fields, London, says: "Sooner or later some one system of embossed printing will be generally adopted, and it must embrace the following features: It must resemble as nearly as possible the type in use among seeing men; that the blind scholar in learning to read may have every possible help from his remembrance of letters he may once have seen, but which now his fingers must feel for him, or from any one who can read an ordinary book; or, if need be, that a friend may read to him." Systems of notation in raised characters have been invented by Rousseau, Braille, Guadet, and Mahoney, and possess merit, inasmuch as they permit the pupil to record any piece of music for future reference; but the principal method of cultivating music by the blind must always be by the ear, and in this they excel. —As to the extent of the misfortune of loss of sight as compared to that of loss of hearing and speech, Mr. Johns substantially says: "At first one would be naturally led to suppose that the condition of the blind man is by far the most deplorable; that his isolation is more

EMINENT BLIND PERSONS.

NAME.	Country.	Born or flourished.	Died.	At what age became blind.	For what celebrated.
Cn. Aufidius, Prætor	Rome	B. C. 103	....	In youth	Philosophy, geometry; History of Greece.
Diodotus	Asia Minor	50	....	At adult age	Philosophy; preceptor of Cicero.
Eusebius the Asiatic	Asia Minor	A. D. 315	A. D. 340	At 5 years	Philosophy and divinity.
Didymus of Alexandria	Egypt	....	398	At 5 years	Rhetoric and theology.
Enrico Dandolo, Doge	Venice	1103	1205	Old age.	Military exploits.
Henry the Minstrel	Scotland	1361	....	Born blind	Poetry; Life of Wallace.
Sir John Gower	London	1320	1402	Manhood	Poetry; Confessio Amantis.
John Zisca	Bohemia	....	1424	.....	Patriotism and military genius.
Nicaise of Mechlin	Belgium	....	1492	At 3 years	Law and divinity.
Peter Pontanus	Bruges, Belgium	ab. 1480	af. 1529	At 3 years	Philosophy and literature.
Margaret of Ravenna	Russy, nr. Ravenna	....	1505	At 3 months	Theology and morals.
J. Schegkius, of Thorndorf	Würtemberg	....	1587	In youth	Philosophy and medicine.
John Fernand	Belgium	1450	1496	Born blind	Poetry, philosophy, and religion.
Herman Torrentius	Switzerland	1450	1520	.....	Literature.
Giovanni Paolo Lomazzo	Milan, Italy	1538	ab. 1600	At 17 years	Painting and literature.
Francisco Salinas	Spain	1513	1590	In childhood	Greek, mathematics, and music.
Count de Pagan	Marseilles	1604	1665	At 38 years	Mathematics and mechanics.
Prosper Fagnani	Rome	1598	1678	.....	Commentary on law.
Claude Comiers	Dauphiny, France	....	1693	.....	Astronomy, theology.
Bourchenu de Valbonnais	Grenoble, France	1651	....	In infancy	History of Dauphiny.
Nicholas Saunderson	Yorkshire, Engl'd	1682	1739	At 1 year	Mathematics.
Henry Moyes	Kirkcaldy, Scotl'd	1750	1807	At 3 years	Music and natural philosophy.
Thomas Blacklock, D. D.	Annan, Scotland	1721	1791	At 6 months	Poetry, divinity, and music.
Gottlieb Konrad Pfeffel	Colmar, Germany	1736	1809	In infancy	Poetry; Fables, 6 vols. 8vo.
Herr Weissenburg	Mannheim, Germ'y	ab. 1740	....	At 7 years	Geography, maps in relief.
François Huber	Geneva	1750	1831	At 17 years	Natural history.
Giovanni Gonelli	Cambassi, Italy	1610	1664	At 20 years	Sculptor.
Theresa von Paradis	Vienna	1759	1824	At 5 years	Pianist and composer.
Anna Williams	Wales	1706	1783	At 34 years	Poetry.
John Milton	London	1608	1674	At 44 years	Poetry.
Rev. John Troughton	Coventry, England	1637	1681	At 4 years	Theology.
Leonard Euler	Basel, Switzerland	1707	1783	At 50 years	Mathematics and astronomy.
John Stanley	London	1713	1786	At 2 years	Music; oratorio of Jephtha.
Edward Rushton	Liverpool	1756	1814	At 19 years	Poems; Letters to Washington.
John Metcalf	Knaresboro', Eng.	1717	1802	At 6 years	Road surveyor and contractor.
John Gough	Kendal, England	1757	1825	At 3 years	Botany and natural philosophy.
M. Avisse	France	1772	1801	In youth	Poet, and teacher of the blind.
M. Buret	France	ab. 1800	....	At 25 years	Sculpture.
John Kay	Glasgow	1777	1809	At 10 years	Mechanics.
Sir John Fielding	Westminster	....	1780	From youth	Police magistrate.
David Macbeth	Dalkeith, Scotland	1792	1834	At an early age	Music and mathematics.
Joseph Kleinhauns	Tyrol	1732	1850	At 5 years	Sculptor and carver in wood.
Herr Knie	Prussia	....	....	Born blind	Director of a blind institution.
Alexander Rodenbach	Belgium	1786	....	At 11 years	Member of the Belgian congress.
James Holman	Exeter, England	1786	1857	.....	Traveller and author.
M. Moncoulteau	Paris	ab. 1800	....	Born blind	Treatise on Harmony.
Augustin Thierry	Paris	1795	1856	At 27 years	History of the Norman conquest.
Louis Braille	Lagny, France	1809	....	At 6 years	Inventor of point-writing for blind.
Frances Brown	Ireland	1818	....	At 18 months	Poetry and fiction.
Timothy Woodbridge	Stockbridge, Mass.	1784	1862	At 16 years	Clergyman and author; discourses.
Samuel Willard	Deerfield, Mass	1775	1859	At 43 years	Clergyman and author; hymns.

complete. But no one who has ever really known an educated blind man in society will again incline to such an opinion. It is true that the deaf mute can see all that is going on around him, but he can mostly only take an imperfect part in it. From the world of sweet sound he is utterly barred out, while the divine gift of speech is entirely denied him; but the blind man enters into the society of his fellow men as freely as if gifted with the keenest vision. The whole world of sound is open to him with all its special speaking, joy, and beauty; the silver paradise of music opens to him her fairy gates, a new guide takes him by the hand, and under her glowing, joyous sway he travels swiftly to the land where faith is even greater than sight." In the cases of such men as Saunderson, Huber, Zisca, Dr. Blacklock, and others, it may be believed that scarcely any calamity not involving the loss of mental health would have hindered the development of their innate greatness. That a blind boy should ever come to occupy the chair in a university once held by Newton, that a blind youth should successfully prosecute investigations in a field of natural history which required the most careful observation, or that it should be said of a man, as it was of Zisca, that "he was more dreaded by the enemies of his country after he became blind than before," must ever be matter of wonder and admiration. A list of the most famous blind persons mentioned in history and others of eminence will be found in the preceding table. Of the living blind men in the United States who have become distinguished as authors and teachers may be mentioned the Rev. William H. Milburn, a pulpit orator of much power, and author of a book called "Rifle, Axe, and Saddlebags," and several other popular works; William H. Churchman, the present able superintendent of the institution for the blind at Indianapolis; J. M. Sturtevant, superintendent of the institution for the blind at Nashville; Otis Patten, superintendent of the institution for the blind at Little Rock; the Rev. Patrick Lane, superintendent of the institution for the blind at Baton Rouge; and the Rev. Adam McClellan of Brooklyn.

BLIND, Karl, a German political agitator, born in Mannheim, Sept. 4, 1820. While studying law in Heidelberg he was twice arrested for political offences, and spent several months in prison. He was banished from Germany for his participation in the republican rising under Hecker in the spring of 1848, and while plotting with Struve and other exiles, he was expelled from Alsace by order of Gen. Cavaignac on a charge of abetting the Paris insurrection of June. Joining Struve in the September movement, he was with him captured after the fight at Staufen, in S. Baden, and sentenced to eight years' imprisonment at Bruchsal. Liberated after eight months by a revolutionary mob, he went to Carlsruhe, whence the grand duke had fled; but Brentano, whom he accused of secretly working for the restoration of the deposed dynasty, soon got rid of him by sending him as a plenipotentiary of the provisional government of Baden and the Palatinate to Paris. There he was accused of encouraging the rising of June 13, 1849. Expelled from France in August, he went to Brussels, but was obliged to leave that city also in 1852, and established himself in London, where he for a long time continued his political agitations through the press of various countries. After the events of 1866, however, his revolutionary ardor abated. He was pardoned by the Baden government in 1867. In 1872 he published a pamphlet entitled "Away with the House of Peers," which was exclusively circulated in Berlin.

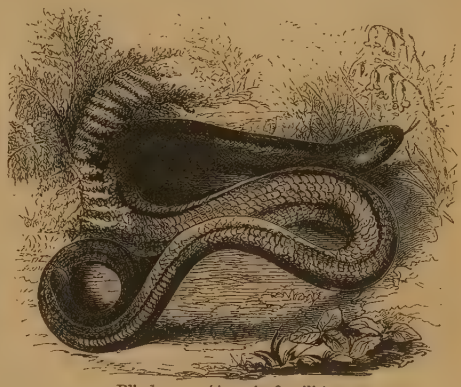
BLIND FISH, the common name of several species of fish, of different genera, living in the subterranean waters of the United States and Cuba; but especially of the *amblyopsis spelæus* (De Kay) of the Mammoth cave of Kentucky. In some of the lamprey-like fishes the eyes are

Blind Fish (Amblyopsis spelæus).

mere specks, serving only for the simple perception of light, without the formation of an image; many catfishes (*siluridæ*) have similar rudimentary eyes, entirely unfit for purposes of vision. In the Mammoth cave these fishes are nearly colorless, while the blind catfishes retain the general dark color of other members of the family. The common blind fish comes nearest to the cyprinodonts and the shore minnows. They are rather solitary, difficult to capture by the net from the acuteness of their senses of hearing and touch, and look like ghosts in the water; they are very active, taking their food both at the surface and near the bottom, and are able to capture a rapid-moving mudfish (*melanura*), having eyes, living in the same waters; the blind fish, with its sensitive tactile organs, is able to pursue and overtake the fish with eyes, but without a highly developed sense of touch, and which constantly encounters obstacles in the darkness. They are viviparous, bringing forth their young in September and October; they vary in length from 2 to 4½ inches. The head of *amblyopsis*

is without scales as far as the pectoral fins, the rest of the body having small ones; the sides of the head are provided with numerous transverse and longitudinal ridges, each having 20 to 30 papillæ, cup-shaped at the top and with a delicate tactile filament freely supplied with nerves from the 5th pair; there are also on the sides, from the pectoral to the tail, about 10 vertical ridges, with the papilla less well defined; the naked skin is of extreme delicacy. The optic lobes of the brain are as well developed as in ordinary fishes, and rudimentary eyes have been found under the skin by Prof. J. Wyman and others. The eyes have the membranes, pigment, and lens, and, though imperfect, are constructed after the vertebrate type. They cannot form an image, as the integument and areolar tissue over them would prevent the transmission of any but very diffused light; no pupil or undoubted iris has been found. The organ of hearing is largely developed. The vent is in advance of the pectorals. They are probably distributed in all the subterranean rivers flowing through the limestone region under the carboniferous rocks of the central United States; they have often been taken from wells.—Another colorless blind fish (*typhlichthys subterraneus*, Girard), 1½ to 2 inches long and having no ventral fins, has been found in the Mammoth cave, and in the central and southern portion of the subterranean region. In the genus *chologaster* (Ag.) are found all the family characters of the above two blind species, but it has eyes, a brownish color, and no papillary ridges on the head and body; yet it is a subterranean fish in some instances. In the Cuban blind fishes (genera *lucifuga* and *stygicola*), described by Prof. Poey, there are ciliary appendages on the head and body, well developed as organs of touch, but without the tactile barbels on the jaws usually found in the cod group, to which these fishes are nearly allied; the optic lobes are large, and the eyes exist, but so imbedded in the flesh of the head as to be useless; the body, cheeks, and opercular bones are covered with scales. Though they resemble *amblyopsis*, it will be seen that they belong to a marine family, though now found in fresh water in caves, and are far removed from the latter.—From the facts here enumerated, and many others that may be found in the "American Naturalist," vol. vi., pp. 6–30, for January, 1872, Mr. F. W. Putnam expresses the opinion that these fishes have always been blind, and have not become so from living in darkness. As far as known, the young of blind fishes have no external eyes when born.

BLINDWORM (*anguis fragilis*, Linn.), a reptile of the order of saurians and family of scincoids, or *lepido-sauri*. It is neither a worm, nor is it blind. The family is extremely interesting, as it serves to establish a gradation between the true saurians and the serpents by means of the genus *anguis* and others nearly allied to it, in which the body becomes elongated and serpentiform, the ribs increase in number, and the limbs cease to appear externally, being quite rudimentary. We see a similar approach to the ophidians in some of the cyclosaurians, as in the amphisbæna, which is properly a saurian. These intermediate forms were placed by Gray in his order of saurophidians; while Merrem, being unable to draw the line between ophidians and saurians, united them into the single order *squamata*. The body and tail of the blindworm are cylindrical and snake-like, the latter being as long as the former, and even longer; the head, triangular and rounded in front, is covered by 11 large and several smaller plates; the nostrils are lateral, each opening in the centre of the nasal plates; the tongue is free, flat, not retractile into a sheath, divided slightly at the end, but not forked like that of the serpent, its surface partly granular and partly velvety; the palate is not toothed; the jaw teeth are small, sharp, and inclined backward. The bones of the head are not movable as in serpents, and the jaws are short and united firmly at the symphysis, so that the opening of the mouth is always the same, contrasting strongly with the great mobility and extensibility of those parts in ophidians. The genus *anguis*, and its allied genera, also approach the saurians, and differ from the serpents, in having two eyelids, moving vertically, and capable of entirely covering the eye, the lower one provided with scales. The external auditory foramen is distinct, though small and linear; there are no legs, but the rudiments of the shoulder, sternum, and pelvis are found in the substance of the muscles, while in the snakes they are reduced to a mere vestige of a posterior extremity. The scales are six-sided, except on the sides where they are rhomboid, smooth, imbricated, or fish-like, and nearly of the same size above and beneath. One lung is much more developed than the other, as in serpents; the opening of the cloaca is transverse. The blindworm is found in Europe, from Russia and Sweden to the Mediterranean, and also in northern Africa; it forms now the only species of the genus *anguis*,



Blindworm (Anguis fragilis).

which formerly included all the scaled reptiles with very short or no feet, and with the scales nearly alike above and below. It is gentle and inoffensive in its habits, and quite harmless; even if provoked to bite, its teeth are so small and weak as hardly to make an impression upon the human skin. It is very timid, and when taken hold of is in the habit of forcibly and stiffly contracting the body, in which state it becomes so fragile as to be broken by a slight blow, or an attempt to bend it; hence its specific name *fragilis*. The glass snake, an American species of saurian (*ophisaurus*), possesses the same property, as do many other scincoids. There is no rupture of muscular fibre, but a separation of one layer from the adjoining one; in such cases, the detached portion is said to be reproduced the next year. From its smoothness it is able to penetrate into very small openings, and it delights to burrow in soft dry soil, and under decaying wood and leaves; it moves by lateral contractions, and sheds its skin, according to Bell, like the true snakes. It is ovo-viviparous, the young being brought forth alive in June or July, to the number of from 7 to 14. The general color is a brownish gray, with a silvery glance, with several parallel longitudinal rows of dark spots on the sides, and one along the middle of the back; the length is from 10 to 14 inches, of which the head is about half an inch. Its food consists of worms, insects, and small terrestrial mollusks; it is not fond of the water. In France it is called *l'orvet*. The blindworm approaches the ophidians in its form, manner of progression, absence of feet, number of ribs, and inequality of lung development; but it belongs to the scincoid saurians by the structure of the tongue, head, and jaws, by the occurrence of movable eyelids, and by the peculiarities of the vertebral column.

BLISTER, a topical application, which, applied to the skin, produces an irritation, and raises the cuticle in the form of a vesicle filled with serous fluid. The powder of the dried cantharis, or Spanish fly, operates rapidly, with certainty, and is now invariably used for this purpose. (See CANTHARIDES.) Morbid action in one part of the organism may often be relieved or removed by counter-irritation in another and a neighboring part, and on this principle the blister is applied. When the immediate effect of a blister is required, the vinegar of cantharides is a very prompt and effectual application. A piece of blotting paper moistened with this fluid raises a blister almost immediately. It is sometimes thus applied behind the ears in toothache, or over the stomach in cases of sudden cramp. The raw surface produced in this manner affords a ready means of introducing certain medicinal substances into the system by absorption; morphine, for instance, sprinkled on this raw surface, is quickly absorbed, and patients may be thus relieved where remedies could not be otherwise employed, as in colic and cholera.

BLOCH, Markus Elieser, a German naturalist, of Jewish parentage, born at Anspach in 1723, died in Berlin, Aug. 6, 1799. On arriving at manhood he was almost illiterate, but then thoroughly learned German and Latin and devoted himself to medical and scientific studies, taking the degree of M. D. at Frankfort-on-the-Oder. He practised his profession for many years in Berlin, and wrote several medical treatises; but his great work was one on ichthyology (*Allgemeine Naturgeschichte der Fische*, 12 vols., Berlin, 1782–'95), excellently illustrated, which was in its time of great value. He made a fine collection of specimens, which is now in the Berlin zoölogical museum.

BLOCK, Maurice, a French political economist, born in Berlin, Feb. 18, 1816. He was taken to France at the age of five years, and is a naturalized French citizen. In 1843 he was appointed to a position in the statistical bureau of the ministry of agriculture, commerce, and public works, which he resigned in 1861 to devote himself exclusively to authorship. His chief works are: *Des charges de l'agriculture dans les divers pays de l'Europe* (Paris, 1850); *L'Espagne en* 1850; *Statistique de la France* (1860); *Puissance comparée des divers États de l'Europe* (1862); *Les finances de France depuis* 1815 (1863); *Les théoriciens du socialisme en Allemagne* (1872); and *Annuaire de l'administration française*, which he began in 1858, and continued several years. He has written largely for periodicals on statistics and political economy, and has edited journals devoted to those subjects. In 1861 the academy of sciences gave him the Monthyon prize for statistics.

BLOCKADE, in international law, the closing of an enemy's port by a besieging force. It has been described by Sir William Scott as "a sort of circumvallation round a place, by which all foreign connection and correspondence is, as far as human power can effect it, to be entirely cut off." The circumstances essential to a valid blockade are tolerably well settled by the decisions of eminent jurists in prize cases. The first of these is that a state of war must exist, though this may be without an actual declaration of war, for the blockade may be the first hostile act. The second is that it be sustained by a blockading force sufficient to make it hazardous to attempt to enter or depart from the port, although if the ships composing it be for any short time driven from their positions by sudden tempest or other similar cause, the blockade is not thereby raised. The purpose of this measure is to inflict injury upon an enemy, either by reducing the place, or by weakening his power of resistance by cutting off his supplies, or both; but as a considerable proportion of the injury must fall upon neutrals, the belligerent is justly required to make his blockade what the term imports, and neither would neutral nations submit to it if he did not, nor would the prize courts sanction the captures which might be made for

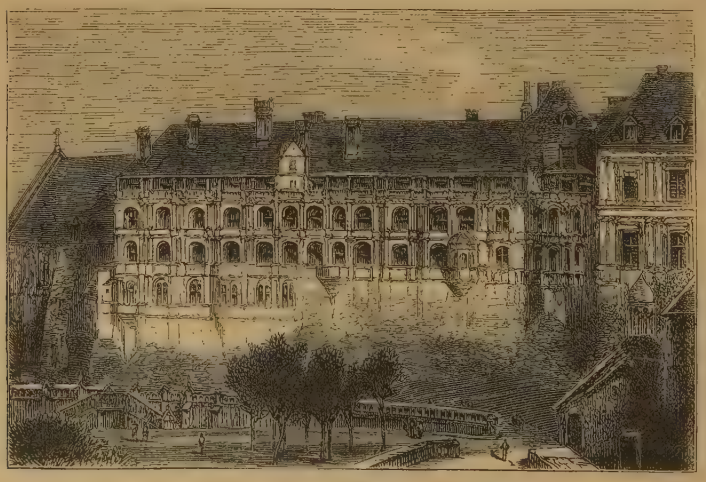
evading it. The third circumstance essential is that a neutral against whom it is sought to be enforced should have been notified of it. The notice may be by formal notification of the executive published to the world, or actual notice at the time trade with the port is attempted; but notice may be presumed in any case where the blockade has become matter of public and general notoriety. The privilege of the blockading force is to seize and send in for condemnation any vessel with its cargo endeavoring to trade with the port; and if the vessel succeeds in violating it, she may be followed and seized on the high seas, and does not purge herself of the offence until she has returned to the port from which she originally set out. In cases of neutral vessels in port when the blockade is declared, the notoriety of the act is sufficient notice; they are at liberty to leave with such cargo as they may then have on board, but must not take on more. A neutral vessel incurs no liability in trading at a port not blockaded in goods destined to the blockaded port by land carriage.—Some notable attempts have been made to enforce mere paper blockades. The Berlin decree of Nov. 21, 1806, of the emperor Napoleon, declared all the British islands in a state of blockade, and threatened capture and condemnation to vessels trading with them. The English government retaliated, and between the Berlin and Milan decrees on the one hand and the orders in council on the other, though no actual blockade was established, all neutral trade with Great Britain and France and their respective colonies and dependencies was threatened with destruction. The United States was the principal sufferer from these measures, and justly considered herself entitled to redress. The breaking out of the civil war in the United States in 1861 presented some embarrassing questions as to the proper course to take in regard to the southern ports. Two courses were open to the government: to declare the ports closed as ports of entry, or to establish a blockade. As the ports belonged to the country, and it was the right of the government to declare what should and what should not be ports of entry, it was argued by some that the simplest course to take was to exercise the undoubted right to close them, and thereby render all trade with them unlawful. Such a course, however, it must be evident, would be taken not in the interests of commerce and not for any motive operating in time of peace, and therefore, whatever name might be given it, would be really a belligerent act resorted to in order to inflict injury upon a public enemy; and it was highly probable that neutral nations would insist that, though called a mere municipal regulation, it was in its nature an attempt at blockade, and to be respected must appear to be made by the proper force. The government took the other course, and in April, 1861, the president issued proclamations declaring the southern ports blockaded. The blockade at first was not so complete as afterward, and some vigorous remonstrances were made against it in England as being in law wholly ineffectual; but the British government, after careful investigation, did not venture to pronounce it insufficient, and correctly laid down the rule of law as follows: "Her majesty's government are of opinion that, assuming the blockade is duly notified, and also that a number of ships is stationed and remains at the entrance of a port sufficient really to prevent access to it, or to create an evident danger in entering or leaving it, and that these ships do not voluntarily permit ingress or egress, the fact that various ships may have successfully escaped through it will not of itself prevent the blockade from being an effective one by international law." Notwithstanding a considerable trade was carried on through the blockaded ports by means of swift vessels constructed for the purpose, this conclusion of the British government was adhered to; the prize courts declared the same doctrine, and Secretary Welles in his annual report for the second year of the war was able to boast of the blockade as "the greatest of all naval triumphs." But some of the ports it was found impossible wholly to close, and in a few instances, notably in the case of Charleston, an attempt was made to preclude passage through some of the channels by sinking therein old vessels, stones, and other obstructions. This, being taken as an attempt to destroy the ports, was remonstrated against by the British minister, as not sanctioned by the laws of war; but it was replied by Mr. Seward that the obstructions were only temporary, and in fact they proved of little importance.—A blockade terminated is said to be raised, and this may be done by public proclamation or by withdrawing the blockading force.

BLOCK ISLAND, an island in the Atlantic ocean, midway between Montauk Point, at the E. extremity of Long Island, and Point Judith, Rhode Island, 8 m. long and from 2 to 5 m. wide. It belongs to the state of Rhode Island, and constitutes the town of New Shoreham, Newport county; pop. in 1871, 1,113. On the N. W. side is a lighthouse with two fixed lights, 58 ft above the level of the sea; lat. 41° 13′ N., lon. 71° 35′ W.

BLODGET, Lorin, an American physicist, born at Jamestown, N. Y., May 25, 1823. He began early to make observations in physical science, and in 1851 became assistant at the Smithsonian institution, Washington, having in charge the researches in climatological and atmospheric physics. In 1852–'3 he directed the organization of the Pacific railroad surveys in the matter of the determination of altitudes and gradients by means of the barometer. In 1854 he prepared a quarto volume of the statistics of scientific observation at the United States military posts. In 1857 he published a valuable work on "The Climatology of the United

States, and of the Temperate Latitudes of the North American Continent," which was widely circulated in Europe, and for which he was highly complimented by Humboldt. It continues to be the standard work on the subject. In 1863 he was placed in charge of the financial and statistical reports of the treasury department, of which he prepared five volumes, 1862–'3 to 1864–'5. Since 1865 he has been United States appraiser at large of customs. For the treasury department he prepared, from 1865 to 1867, reports on finance and revenue; reports on industrial progress and census of industry, 1861 and 1871; and on the resources of North Carolina, 1870. His pamphlet on the "Commercial and Financial Resources of the United States," in 1864, was reprinted in Germany, and did much to sustain the credit of the government in the money markets of the old world.

BLODGET, Samuel, an American inventor, born at Woburn, Mass., in 1720, died at Haverhill, N. H., Sept. 1, 1807. Before the revolution he was judge of common pleas in New Hampshire, and was at the siege of Louisburg in 1745. In 1783, having raised by a machine of his own invention a valuable cargo from a vessel sunk near Plymouth, he became possessed with the idea of recovering the buried treasures of the ocean, and went to Spain and to England with this view. He desired to obtain a contract for raising the Royal George, but meeting with no encouragement returned to New Hampshire, and in 1791 commenced the manufacture of duck. In 1793 he removed to Haverhill, and began the construction of the canal which bears his name, around the Amoskeag falls. Before it was completed, after



Castle of Blois.

spending large sums upon it, he became embarrassed, and was thrown into prison for debt. He was rigidly temperate in his habits, and had peculiar theories about exposure to the weather. He expected by his mode of life to prolong it to the age of 100 years, but at the age of 87 he died from the effects of exposure on a journey from Boston to Haverhill.

BLOEMAERT, Abraham, a Dutch painter, born at Gorkum about 1564, died in Utrecht in 1647. He was the son of an architect, studied under Dutch and French masters, and painted for the churches of Brussels and Mechlin. He excelled in landscape and as a colorist. The best of his historical pictures is that representing the death of Niobe and her children. He produced a number of excellent copper etchings in chiaroscuro. His four sons also were favorably known artists, especially Cornelis and Adrian, engravers.

BLOEMEN. I. Jan Frans van, a Flemish painter, born in Antwerp in 1656, died in Rome in 1740. He was an imitator of Poussin, and was called Orizonte on account of the fine horizons in his Roman landscapes. His best pictures are in the Colonna, Doria, Rospigliosi, and Monte Cavallo palace in Rome. **II. Peter van,** brother of the preceding, born about 1645, died in 1719. He was in Rome till 1699, when he became director of the academy of Antwerp. He excelled chiefly as a painter of battles. The galleries at Berlin, Dresden, and Munich possess some of his pictures.

BLOEMFONTEIN, a town of S. Africa, capital of the Orange River Free State, on the Modder river, a tributary of the Vaal, in lat. 29° 8′ S., lon. 43° 47′ E., about 600 m. N. E. of Cape Town, and 260 m. W. N. W. of Port Natal; pop. 1,200. Under British rule (1848–'54) it was the capital of a district of the same name. Though a small town, it carries on a large commerce in wool and other articles, chiefly with Cape Colony and with the sister republic of Transvaal. It has a theatre, a public school, a club, and a large Dutch Reformed church, besides Anglican, Methodist, and Roman Catholic chapels. The inhabitants are chiefly Boers.

BLOIS, a city of France, capital of the department of Loir-et-Cher, on the right bank of the Loire, and on the railway from Paris to Nantes, 100 m. S. W. of Paris; pop. in 1866, 20,086. It is built on the declivity of a hill overlooking the river. The streets in the upper part are narrow and crooked, and some of them are too steep for the use of carriages, stairs being cut in several places for the accommodation of pedestrians. Blois contains many objects of in-

terest, including a Gothic cathedral, the episcopal palace, the town house, and the ancient castle of the counts of Blois. It was early a place of importance, and during the middle ages was governed by counts descended from Hugh Capet, who also possessed the city of Chartres. The last of them, Guy II., sold his feudal estate to Louis of Orleans, brother of Charles VI., whose grandson, Louis XII., united it to the crown. The castle became a favorite resort of the princes of the house of Valois, and was enlarged and improved at various times until it was one of the handsomest palaces of the country. Francis I., Henry II., Charles IX., and Henry III. held their courts in it, and the states general of France were twice convened there during the reign of Henry III.: in 1576, when they repealed the edict of pacification, and the king, unable to oppose the league, declared himself its chief; and in 1588, when the same prince, fearing he might be deprived of his crown and perhaps his life through the intrigues of the Lorraine princes, had the duke of Guise murdered by his body guards in the antechamber of his own apartments, and the cardinal of Lorraine secretly despatched, a few few hours later, in a more secluded room. When Maria de' Medici was in 1617 exiled from the court, she resided, virtually as a prisoner, in this castle, whence 18 months later she escaped through a high window. In 1814, on the approach of the allied armies to Paris, the empress Maria Louisa and the council of regency repaired for a while to this place. Afterward the castle was entirely neglected, and used as barracks for cavalry. During the later years of Louis Philippe's reign it was carefully restored. Blois has several literary and scientific societies, a botanical garden founded by Henry IV., a public library, a departmental college, and a diocesan seminary, besides hospitals and other public institutions. It trades in wines, spirits, vinegar, staves, and licorice, and produces serges, hosiery, gloves, cutlery, and hardware. A handsome bridge of 11 arches, built in 1717, connects the town with the suburb of St. Gervais. The city is furnished with spring water through an old aqueduct believed to be of Roman origin.

BLOMFIELD, Charles James, an English clergyman and scholar, born at Bury St. Edmunds, May 29, 1786, died in London, Aug. 5, 1857. He was educated at Trinity college, Cambridge, and in 1810–'12 edited the "Prometheus" and other plays of Æschylus. His edition of Callimachus appeared in 1824. He contributed largely to the *Museum Criticum*, and to the quarterly reviews, generally furnishing critical papers on classical subjects. He edited the *Musæ Cantabrigienses* in conjunction with Rennel, and the "Posthumous Tracts" of Porson in conjunction with Monk, afterward bishop of Gloucester. He also edited the *Adversaria Porsoni*, and in 1828 compiled a Greek grammar for schools. In 1810 he was appointed to the rectories of Warrington and Dunton; in 1819 he was made a chaplain to the bishop of London; in 1824 he became bishop of Chester, and in 1828 bishop of London. He occupied that see for 28 years, and retired in September, 1856, on account of ill health, with a pension of £5,000 a year, and the use of the palace at Fulham for life. In parliament he maintained high church principles. He took great interest in measures for the relief of the poor and the improvement of the laboring classes, and advocated the general diffusion of education. Besides his classical publications, he was the author of a "Manual of Family Prayers" and "Lectures on the Acts of the Apostles."

BLOMMAERT, Philip, a Flemish writer, born in Ghent about 1809, died there, Aug. 14, 1871. Possessed of a considerable fortune, he devoted himself to an attempt to revive Flemish literature and the use of his native language. In pursuance of that object he published an edition of the old Flemish poets of the 11th, 12th, 13th, and 14th centuries, with glossaries, notes, and emendations, and afterward published a translation of the *Nibelungenlied*, in iambics. His best work, however, is a history of the Belgians.

BLOND, Jacques Christophe le, a printer of engravings in colors, born in Frankfort-on-the-Main in 1670, died in a hospital in Paris in 1741. He was bred a painter, and in 1711 went to Amsterdam, where he met with great success in painting miniature portraits. He conceived the idea of an establishment to print engravings in colors, and spent the greater part of his life and all the means he could obtain upon experiments which were comparatively unsuccessful. He worked mainly in London and Paris, and, finding at last that he was not to obtain the brilliant results anticipated, turned his attention to producing Raphael's cartoons in tapestry, in which he also failed for lack of means to finish his work. He is regarded as the inventor of printing in colors.

BLONDEL, a French trouvère of the 12th century, born at Nesle, near Péronne, Picardy. He is generally regarded as the minstrel who was the friend, teacher, and companion of Richard Cœur de Lion in his expeditions. According to a tradition, when Richard on his return from the Holy Land was imprisoned by Leopold of Austria in the fortress of Dürrenstein, Blondel discovered the place of his captivity by singing under the castle window a part of one of his familiar songs, the other part being taken up from within by the king. Blondel then went to England and caused the monarch to be ransomed. This story is confirmed by the chronicles of Rheims of the 13th century, edited by Alexis Paulin Paris (1836); but it does not seem to be corroborated by other authorities. The national and arsenal libraries of Paris contain 29 MS. songs, part of which are ascribed to the trouvère, and others to the French poet Robert Blondel, who died about 1461. *Les œuvres de Blondel de Néele*, by Prosper Tarbé (Rheims, 1862), contain a

full account of the historical and legendary data respecting Blondel and an edition of his and Richard's songs.

BLOOD, in man and the higher animals, the red liquid which circulates in the cavities of the heart, the arteries, the veins, and the capillary vessels. I. Physical Qualities of the Blood. In the living body the blood is a somewhat tenacious liquid, containing innumerable solid particles (the blood globules), which are seen only with the microscope. In the arteries the blood is more or less of a light vermilion tint in children, and of a purplish or bright cherry red in adults, and somewhat darker in old people and in pregnant women. In the veins it is dark red, and even blackish. In disease, and also in various physiological states, the blood may be very dark in the arteries, and in other cases very bright in the veins. The peculiar odor of the blood usually resembles that of the perspiration of the individual from whom the blood has been taken. The blood is transparent when seen in thin layers; opaque otherwise. The specific gravity of normal human blood averages 1·055, its physiological limits being 1·045 and 1·075. The minimum of density is in pregnant women and in children, and the maximum in adult men. The capacity of the blood for heat is, according to Nasse, in an exact ratio to its density. II. Quantity of Blood in the Human Body. Of the various means employed to find out the relative amount of blood in the body, that which consists in first weighing an animal, then taking out as much of its blood as possible, and weighing the latter, is not to be relied on, as the blood never flows out entirely from the blood vessels. However, as it is interesting to know how much blood may escape from divided blood vessels, we will give a list of the results obtained by various experiments. In the ewe the weight of the blood is to the weight of the body as 1 to 22 or 23; in the ox as 1 to 12 (Herbst), or 1 to 23 or 24 (Wanner); in the cow, as 1 to 21·77; in the sheep, as 1 to 20 or 27·72; in the dog, as 1 to 10 or 12, or 21; in the horse, as 1 to 18; in the lamb, as 1 to 20 or 22; in the cat, as 1 to 22; in the rabbit, as 1 to 24 or 29; in the ass, as 1 to 23; in the fox, as 1 to 21; in the mouse, as 1 to 22·5. From these results, it has been concluded that in man the proportion of blood is from $\frac{1}{20}$ to $\frac{1}{10}$, and therefore, for a man weighing 160 lbs., the quantity of blood is from 8 to 16 lbs. But Haller relates many cases of hemorrhage in which men and women have lost 9, 10, 11, 15, 18, or 22 lbs., or even 30 lbs. of blood from the nose, and 12 lbs. in one night, or 8 pints, by vomiting (*gastrorhagia*). Burdach says that Wrisberg has seen a woman who died from a loss of 26 lbs. of blood from the uterus, and that another woman after decapitation yielded 24 lbs. of blood. From facts of this kind Haller, Quesnay, and Hoffmann inferred that there is about 28 lbs. of blood in the body of a man of average size. The best mode of estimating the amount of blood in a man has been employed by Lehmann and E. Weber. They determined the weight of two criminals both before and after decapitation. The quantity of the blood which escaped from the body was ascertained in the following manner: water was injected into the vessels of the trunk and head, until the fluid escaping from the veins had only a pale red or yellow color; the quantity of the blood remaining in the body was then calculated, by instituting a comparison between the solid residue of this pale red aqueous fluid, and that of the blood which first escaped. By way of illustration, we subjoin the results yielded by one of the experiments. The living body of one of the criminals weighed 60,140 grammes, and the same body, after decapitation, 54,600 grammes; consequently, 5,540 grammes of blood had escaped; 28·56 grammes of this blood yielded 5·36 grammes of solid residue; 60·5 grammes sanguineous water, collected after the injection, contained 3·724 grammes of solid substances; 6·050 grammes of the sanguineous water that returned from the veins were collected, and these contained 37·24 grammes of solid residue, which corresponds to 1,980 grammes of blood; consequently, the body contained 7,520 grammes of blood (5,540 escaping in the act of decapitation, and 1,980 remaining in the body); hence, the weight of the whole of the blood was to that of the body nearly in the ratio of 1 to 8. The other experiment yielded a precisely similar result. By this mode of calculation, which gives a nearer approximation than any other to the proportion of blood, we have not, however, the exact proportion, because blood remains in some of the capillaries. The only positive conclusion we can draw from these experiments is that there is at least 20 lbs. of blood in the body of a healthy man weighing 160 lbs. Valentin has employed another mode of calculation, which, unlike the preceding, has given a proportion of blood in the body greater than that which really exists. He bleeds an animal, and determines the proportion of solid parts in the blood; then a certain quantity of water is injected into the veins, and immediately afterward blood is drawn again, and its proportion of solid parts determined; and after a comparison of the two results, a calculation is made which gives the quantity of blood. In dogs it was found that the amount of blood, compared to the weight of the body, is as 1 to $4\frac{1}{3}$, and in sheep as 1 to 5. If this result be applied to man, we find, for a man weighing 160 lbs., from 32 to 36 lbs. of blood, which is most probably an over-estimate. Dr. Blake, by another method, has obtained more important results. He injects into the veins of an animal a certain quantity of the sulphate of alumina, a salt which is not quickly destroyed in the blood, or expelled from it; then he analyzes the blood, and by the proportion of this salt found in it he ascertains very nearly the quantity of blood in the body of the animal. The

conclusion is that there is 1 lb. of blood for 8 or 9 of the animal, and therefore from 18 to 20 lbs. of blood in a man weighing 160 lbs. From all these facts it results that the quantity of blood in an adult man is very likely a little above 20 lbs. There is more blood in men than in women. It is not positively determined whether a fat or a lean person has most blood; but Schultz says that there is more blood in lean oxen than in fat ones. Bérard justly remarks that it is a mistake to believe that there is proportionally more blood in newly born children than in adults. III. Composition of the Blood. There is no fluid in the body having so complex a composition as the blood. This fact may be easily understood, as we know that through the blood passes everything that is going to or coming from all parts of the body, either solid or liquid. The chemical analysis of the blood is extremely difficult, and much is still to be learned as regards its composition. On comparing the results obtained by various experimenters who have analyzed the blood, we find a great difference between them. Gorup-Besanez has proved that these differences depend mostly on the method of analysis; for he found that when four samples of the same blood were analyzed by himself according to the four principal methods, the results were strikingly different, as the following table will show:

	Authors of the various methods.			
	Scherer.	Becquerel and Rodier.	Hoefle.	Gorup-Besanez.
Water	796·93	796·93	796·93	796·93
Solid matters	203·07	203·07	203·07	203·07
Fibrine	1·95	1·95	1·95	1·95
Corpuscles	115·16	117·82	103·23	103·23
Albumen	53·82	63·87	50·84	70·75
Extractive matters and salts	27·14	19·43	47·05	27·14

Hence it is of no value to compare researches on the composition of blood in disease in men at different ages, or in different animals, made by experimenters who have employed different methods. The following table represents the composition of normal human blood, according to the researches of Lehmann. It will be seen that the proportion of corpuscles is notably larger than in the former table.

1. Water			795·45	
2. Solid residue 204·55.	1. Fibrine		2·025	
	2. Corpuscles	Hæmatine	8·375	196·215
		Globuline & cell membrane	141·110	
	3. Albumen		39·420	
	4. Fatty matters		2·015	
	5. Extractive matters		3·270	
	6. Mineral substances, exclusive of iron	Chlorine	2·665	8·335
		Sulphuric acid	·090	
		Phosphoric acid	·663	
		Potassium	1·825	
		Sodium	2·197	
		Oxygen	·535	
		Phosphate of lime	·212	
		Phosphate of magnesia	·148	

This is another proof of the differences due to methods of analysis: in the last case, the corpuscles of the blood have not been deprived of their salts, and therefore their weight is more considerable than in cases where they lose a part of their constituents before being weighed. Many other substances are found in the blood besides those above enumerated. Among the fatty matters we find the saponifiable fats (which chiefly consist of oleate and margarate of soda), a phosphorized fatty matter, cholesterine, and seroline. Besides these substances, there is probably also one or many volatile fatty acids, to which the blood owes its odor. The so-called extractive substances of the blood are very different from each other, some of them being nitrogenized matters, while others are not. Among these substances are found what Mulder calls binoxide and tritoxide of proteine and sugar, urea, uric and hippuric acids, creatine, creatinine, &c. In the blood vessels, and during life, blood consists essentially of two parts, which differ extremely: one is solid, the corpuscles or globules, the other is liquid, the liquor sanguinis. According to Lehmann, the corpuscles form fully one half of the volume of the blood. Their analysis compared to that of the liquor sanguinis shows that they differ much from it:

1,000 parts of blood corpuscles contain		1,000 parts of liquor sanguinis contain	
Water	688·00	Water	902·90
Solid residue	312·00	Solid residue	97·10
Hæmatine (including iron)	16·75	Fibrine	4·05
Globuline and cell membrane	282·22	Albumen	78·84
Fat	2·31	Fat	1·72
Extractive matters	2·60	Extractive matters	3·94
Mineral substances	8·12	Mineral substances	8·55
1. Chlorine	1·686	1. Chlorine	3·644
2. Sulphuric acid	0·066	2. Sulphuric acid	0·115
3. Phosphoric acid	1·134	3. Phosphoric acid	0·191
4. Potassium	3·328	4. Potassium	0·323
5. Sodium	1·052	5. Sodium	3·341
6. Oxygen	0·667	6. Oxygen	0·403
7. Phosphate of lime	0·114	7. Phosphate of lime	0·311
8. Phosphate of magnesia	0·073	8. Phosphate of magnesia	0·222

Of the many metals found in the blood, the most important seems to be iron, which is found not only in the blood, but, according to M. Verdeil, in all the coloring matters of the body. Iron in the blood is found only in the corpuscles, combined with the coloring matter, the hæmatine. According to Lecanu, there is 7 per cent. of iron in hæmatine. In 15 kilogrammes (33 lbs.) of blood, the proportion of hæmatine is about 34 grammes (1 oz.), and therefore the quantity of iron is nearly 2·42 grammes (nearly 50 grains). Copper was found in the blood by Sarzeau, and manganese by Denis. Millon ascertained the constant existence of these two metals, and also of lead, in the blood. These metals exist in greater quantity in the globules than in the liquor sanguinis. It is very important to know that these metals, and particularly copper, exist normally in the blood, to avoid mistakes that might be made

in cases of suspected poisoning by them. It has been said that arsenic exists normally in blood, but this assertion has been disproved. Nickles has pointed out the existence of an interesting element in blood, fluorine. The blood of man differs from that of woman, as will be seen by the following comparative analyses made by Becquerel and Rodier:

	Man.	Woman.
Density of defibrinated blood	1060·2	1057·5
Water	779	791
Corpuscles	141·1	127·2
Albumen	69·4	70·5
Fibrine	2·2	2·2
Extractive matters and free salts	6·8	7·4
Fatty matters	1·600	1·620
Seroline	0·020	0·020
Phosphorized fatty matter	0·488	0·464
Cholesterine	0·088	0·090
Animal soap	1·004	1·046

The same chemists have also found that there is less iron in the blood of woman than in that of man. The blood of children is richer in solid constituents, and especially blood corpuscles, than that of adults. It is just the reverse with the blood of old people compared to that of adults. During pregnancy the blood contains more water than in other circumstances; the quantity of albumen and of blood corpuscles is diminished. Cazeaux has justly pointed out that the so-called plethora of pregnant women is not a plethora of blood, but of water, and that it is usually very wrong to bleed women during pregnancy only because they seem to have too much blood. Among animals, the blood of omnivora and carnivora is richer in organic solid constituents than that of the herbivora. So also is that of the warm-blooded vertebrata, compared to the cold-blooded. The blood of the arteries differs from that of the veins in many points. Its corpuscles have a smaller quantity of solid constituents, especially fats, but they contain relatively more hæmatine and salts. It has more fibrine and more water, and therefore relatively less albumen. It has also a much smaller quantity of fats, and a much greater amount of extractive matters, while its salts are diminished. For the composition of the blood of the portal and hepatic veins, see LIVER.—Changes in the composition of the blood are effected very quickly; during digestion, for instance, the solid constituents of the blood manifestly increase, while the reverse takes place during fasting. In all the circumstances which modify the blood, it is chiefly the number and the composition of the blood corpuscles which change. The differences between different animals as to the quantity of blood corpuscles are very great; for instance, the pig has 145·5 of dry blood corpuscles, while the goat has only 86·0, out of 1,000 parts of blood. Of course this relates only to dried corpuscles, as Lehmann has found that the normal corpuscles in man form more than one half the quantity of the blood. When it is said that the proportion of corpuscles is only $\frac{141}{1000}$ of the blood, this relates to dry corpuscles. The proportion of this most important element in the blood of man is put down at a higher or lower amount, according to the means employed to separate or to dry them. In this way we may explain how Lehmann gives the proportion of 149·485 for the dry corpuscles in 1,000 parts of blood, while Becquerel and Rodier give the proportion of 141·1, Richardson 134·8, Lecanu 132·5, Prévost and Dumas 129·0, Andral and Gavarret 127·0, Popp 120·0, Nasse 116·5, and Scherer only 112·0, for the blood of man. The quantity of fibrine in the blood, even in very weak anæmic or hydræmic persons, increases in all cases of inflammation accompanied with fever. IV. MICROSCOPICAL STUDY OF THE BLOOD. When the blood is examined with a microscope, many things may be found: 1, red corpuscles or disks; 2, white, or rather colorless, corpuscles; 3, molecular elements; 4, pigment; 5, crystals; 6, coagulated fibrine. We will study successively these different elements. 1. *Red corpuscles or disks.* Their discovery is due to Malpighi (in 1666), although it seems that Swammerdam had seen them a few years before. They are found in the blood of all the vertebrata. Their form varies much in animals of different classes. In man they are thick, circular, slightly biconcave disks, consisting of a colorless investing membrane, and of red or, in refracted light, yellow, viscid, fluid contents. They have no nucleus, at least in adult men. In the other mammalia the red corpuscles are more or less similar to those of man—except, however, a few tribes (camel, dromedary, llama), in which the red corpuscles are not circular and concave, but elliptic and biconvex. In birds they are also elliptic or oval, and elevated in the centre. In amphibia they are oval also, and strongly convex. We owe to the laborious researches of Gulliver the indication of the size of the red corpuscles in an immense number of animals. We will take from the table he has published only what relates to man and to the most common animals, or to those which have

MEASUREMENTS OF THE RED CORPUSCLES OF THE BLOOD.

I. MAMMALIA.	Long diameter.
1. Man	3200
2. Monkeys, from 3624 to	3338
3. Bats, from 4465 to	4175
4. Mole	4747
5. Bear (Ursus Americanus)	3693
6. Dog	3542
7. Wolf	3600
8. Cat	4404
9. Lion	4322
10. Tiger	4206
11. Whale	3099
12. Pig	4230
13. Elephant	2745
14. Horse	4600
15. Ass	4000
16. Ox	4267
17. Red deer	4324
18. Sheep	5300
19. Goat	6366
20. Hare	3560
21. Rabbit	3607
22. Mouse	3614
MAMMALIA (continued).	
23. Beaver	3325
24. Guinea pig	3588
II. BIRDS.	
1. Raven	1961
2. Swallow	2170
3. Cock	2102
4. Swan	1806
III. REPTILES.	
1. Tortoise (land)	1252
2. Alligator	1824
3. Lizard	1555
IV. AMPHIBIA.	
1. Common frog	1108
2. Common toad	1043
3. Siren	420
V. FISHES.	
1. Perch	2099
2. Carp	2142
3. Eel	1745

corpuscles of the most remarkable size. The measurements are all made in vulgar fractions of an English inch; but for the sake of convenience, the numerator, being invariably 1, is omitted, and the denominators only are printed. These measures show that the size of the blood corpuscles is not at all in proportion with the size of the animal. For instance, the corpuscles of man are larger than those of the ass, the horse, the bear, the lion, the tiger, &c., which are larger animals than man. It is nevertheless remarkable that the elephant and the whale are among the animals whose blood corpuscles are the largest. In the same individual the blood disks are not all of the same size; in man their diameter varies between $\frac{1}{4800}$ to $\frac{1}{2800}$ of an inch, the average being $\frac{1}{3200}$. The red corpuscles of man, although larger than those of most of the mammalia, are so small (the $\frac{1}{3200}$ part of an inch) that, according to Home, 19,880 of these corpuscles, placed side by side, would cover only a surface of a square inch. Young says that to cover such a surface 255,000 corpuscles would be necessary. The number of red corpuscles in the body of a man is immense. To convey an idea of this number, we will merely state that, according to Stöltzing, there are from three to four or five millions of corpuscles in one cubic millimetre (the linear millimetre being about $\frac{1}{25}$ of an inch). Vierordt and Vœlcker had already obtained analogous results. The red corpuscles are very elastic and pliant, so much so that they may pass through blood vessels the diameter of which is somewhat smaller than theirs. They exist in all the vertebrata except one, the lancelet (*amphioxus lanceolatus*), a very singular and little developed fish. 2. *White or colorless corpuscles.* These globules seem to have been seen for the first time by the celebrated Hewson, in the last century. However, it is only in our days that they have been well studied. They are found in all the vertebrata, including the amphibia, whose blood has no other corpuscle. They are much more globular than the red corpuscles, but not perfectly spherical; they have a granular capsule and a nucleus of several small ones. They are quite pale or colorless; they do not contain iron, and have much more fat than the red corpuscles. Their size hardly varies in the different classes of animals, so that they are in some smaller and in others larger than the red corpuscles, which vary much in size. In warm-blooded animals (man included) they average rather more than $\frac{1}{3000}$ of an inch in diameter. An interesting fact concerning the pale corpuscles of the blood is, that they seem to be endowed with the faculty of altering their form. According to the discovery of Mr. Wharton Jones, and to the more recent researches of M. Davaine, they often show a slow protrusion from their membranous wall; after which another one forms itself in another part, while the first slowly disappears; sometimes a depression is formed instead of a protrusion. These changes have been seen even in circulating blood in living animals. These spontaneous alterations of form have been considered by some physiologists as a proof that these cells or corpuscles are microscopical animals. But apparently spontaneous movements are not sufficient signs of independent life, for, admitting that these corpuscles are animalcules, Brown-Séquard has shown that all the muscles of man or of animals, separated from the body, may have apparently spontaneous movements; so that we should have to admit that each elementary muscular fibre is a distinct animal being, if apparently spontaneous motions were a proof of the existence of an independent living organism. The number of colorless cells is very much smaller than that of the red disks. There is one colorless corpuscle to 300 or 400 red, according to Donders and Moleschott. The number of colorless cells increases more than that of the red disks after eating, and particularly after taking albuminous food. 3. *Molecular elements.* There is in the blood a number of exceedingly small solid particles which the French (Donné, Robin) call *globulins* (small globules). Their nature is unknown, and their form has no definite character; it may be that they are particles of coagulated fibrine. 4. *Pigment.* There is frequently, and perhaps always, in the blood of man and of the higher animals, a small quantity of black pigment under various forms. Sometimes there are only exceedingly fine granules, like those of the skin (which are the cause of its color); in other cases there are plates of pigment, which seem chiefly to result from an aggregation of granules. The presence of cells containing black pigment is very rare in the blood. From the researches of Brown-Séquard, it seems that the quantity of pigment increases in the blood of animals when the supra-renal capsules have been extirpated. The accumulation of pigment in the blood of man, according to Planer, and in that of animals, according to Brown-Séquard, is a cause of rapid death. 5. *Crystals.* It happens, though very rarely, that without any preparation the blood corpuscles become decomposed, and their coloring matter, slightly changed in its chemical composition, forms rhomboidal or simple needle-shaped crystals. By the addition of water, of ammonia, or some other reagents, it is easy to produce many crystals in a drop of almost any blood, as has been ascertained by Virchow, Kunde, O. Funke, Reichmann, and others. M. Charles Robin has once found in the liver a mass of altered blood as large as a hazel nut, entirely transformed into crystals, or rather containing nothing but hæmatine crystallized, the other elements of the blood having been absorbed. Brown-Séquard has pointed out the fact that, in dogs especially, after the extirpation of the supra-renal capsules, the formation of crystals in the blood is very considerable and rapid. 6. *Coagulated fibrine.* Some micrographers, especially Nasse and Virchow, call certain solid particles floating in the

blood fibrinous flakes. Henle at first considered these particles as shreds of epithelium, from the lining membrane of the blood vessels; afterward as aggregations of cell membranes of destroyed blood disks. Lehmann admits that experiments of Döderlein have proved that these flakes are not composed of coagulated fibrine. Bruch has tried to show that the pretended fibrinous flakes are nothing more than epithelial cells from the skin of the observer himself, which have fallen from his face or his hands on the preparation. It is very probable that these flakes are in a great measure, but not entirely, composed of epithelial cells, and that truly coagulated fibrine, in more or less small particles, exists in blood out of the blood vessels, at least. Besides the morphological elements above described, we find in the blood of certain inferior animals *vibriones*, or other infusoria, and microscopical drops of fat. The assumed presence in the blood of another distinct element, *i. e.*, the lymph or chyle corpuscle, has received a different interpretation from that previously admitted: the colorless or pale corpuscles of the blood have been proved to be similar to the chyle or lymph corpuscles.

V. Coagulation of the Blood. When drawn from a vein or an artery of man, blood usually begins to coagulate in a few minutes. From the liquid state it passes at first to the condition of a soft jelly, which gradually becomes more and more consistent. The whole mass of the blood seems in the beginning to become solid, but by the contraction of the coagulated substance the liquid is expelled from the kind of network formed by this substance, and the coagulum or clot gradually becomes smaller. The part of the blood which remains liquid is called serum. It had been imagined that the coagulation of the blood depended upon the adhesion of the blood corpuscles one to the other; but it is now well known that the coagulation is only the result of the solidification of the fibrine, which, taking place in the whole mass of the blood, contains the blood corpuscles imprisoned in the network it forms. The following table shows what changes take place in the blood during coagulation:

Liq. blood	Liquor sanguinis	Serum		Coag. blood.
		Fibrine	Clot	
	Blood corpuscles			

The serum is the liquor sanguinis deprived of its fibrine, and no longer holding the corpuscles; the clot is the fibrine solidified, and holding the blood corpuscles. It is well proved that the coagulation of the blood, removed from the body, depends upon the coagulation of its fibrine. If blood drawn from the vessels of a living man or animal be whipped with glass rods, its fibrine becomes solidified on these rods, and the whole of it may in this manner be taken away, and then the defibrinated blood remains liquid. Nevertheless, many blood corpuscles sometimes adhere one with another, and in so doing offer a half solid mass at the bottom of the vase, but the least motion shows that there is no coagulation. When they are included in a fibrinous clot, the blood corpuscles contribute to its solidification by some slight adhesion with the fibrine, and by their being included in its network. The circumstances which influence the coagulation of the blood have been the subject of a great many investigations, among which the most important are those of Hewson, John Davy, T. Thackrah, C. Scudamore, Gulliver, and more recently Zimmermann, E. Brücke, and B. W. Richardson. We will examine here only what relates to the principal circumstances and assumed causes of the coagulation of the blood. 1. *Influence of temperature.* The coagulation of the blood drawn from the blood vessels does not depend upon the loss of its temperature. It is true that the blood flowing from the vein of a man in a room, even at a summer temperature, soon loses several degrees of heat, and falls from 102° to 98°, or to a lower degree.* But this loss of a few degrees of heat cannot be the cause of the coagulation of the blood, because every day, during the winter, our blood, in the nose, in the ears, and the extremities of the limbs, loses many more degrees without coagulating. Besides, the blood of cold-blooded animals coagulates as well as that of the warm-blooded. Hewson has demonstrated that it is possible to freeze the blood while yet fluid, and that after being rendered fluid again by thawing, it will coagulate in the ordinary way. Hunter succeeded in freezing the blood in the ear of a living rabit, and after some time, being thawed, it did not coagulate. A low temperature retards coagulation, but the physiologists who maintain that coagulation is prevented by a temperature near the freezing point are mistaken. Brücke says that he has seen blood coagulated at every temperature above 32° F., and even below that point, provided the blood itself was not frozen. But he has seen the blood of frogs sometimes remain fluid for eight days, while kept in the snow. Brown-Séquard has seen the blood of frogs coagulated so quickly at a temperature of 33° or 34° F., or a little above, that hemorrhage from the section of one third of the ventricular mass of the heart was stopped by a clot, and life was maintained. As a general rule, however, the higher the temperature, within certain limits, the sooner coagulation takes place; but it seems, according to Gulliver, that the coagulating power is lost by a temperature of 150° F., as blood heated to that point remains permanently fluid. The experiments of Polli, Trousseau, Leblanc, and others, seem to show that the temperature most favorable to coagulation is very nearly that of the blood itself. 2. *Influence of air.* Many physiologists have thought that the cause of the coagulation of the blood, when drawn

* The temperature of the blood is erroneously marked at 98° on the thermometers. Experiments made by John Davy and by Brown-Séquard have shown that, at least in the abdomen and in the chest, the blood in man is at a higher degree. According to the last-named experimenter, it is between 102° and 103°.

from the blood vessels of a living man or animal, was a peculiar action of air. Hewson believed that air had a considerable coagulating influence. In proof of this he relates the following experiments: Having laid bare the jugular vein in a living rabbit, he tied it up in three places, and then opened it between two of the ligatures and emptied that part of its blood. He next blew warm air into the empty vein and put another ligature upon it, and, letting it rest till he thought the air had acquired the same degree of heat as the blood, he then removed the intermediate ligature, and mixed the air with the blood. The air immediately made the blood florid where it was in contact with it, as could be seen through the coats of the vein. In a quarter of an hour he opened the vein and found the blood entirely coagulated; and "as the blood," says Hewson, "could not in this time have been completely congealed by rest alone, the air was probably the cause of its coagulation." Brücke says that air blown in the manner mentioned by Hewson usually hastens coagulation, but that it is not always so. Brown-Séquard has ascertained that blood mixed with air blown into the jugular veins of dogs does not always coagulate. In some cases, four months after the operation, the blood was found liquid in the vein between two ligatures. It has been remarked that when blood is placed in a cup, coagulation begins sooner in the part in contact with air than in the interior of the liquid, but Brücke states that he has seen coagulation begin as quickly in the surface in contact with the walls of the cup. If coagulation depended upon a peculiar influence of atmospheric air, it should not take place when blood is not exposed to air. John Davy and H. Nasse have seen coagulation occur as quickly in unexposed as in exposed blood. Scudamore says even that coagulation is more rapid in a pneumatic receiver, where blood is not submitted to the action of air. From many experiments Brücke has drawn the following conclusions: 1. Air usually hastens the coagulation of the blood. 2. Air, when introduced into the heart and vessels of living turtles, does not induce coagulation. 3. The blood of frogs, when deteriorated by the action of the heart or of the other tissues of the animal, and so deprived of its free oxygen, sometimes requires atmospheric air for its coagulation. 4. Normal blood needs not the presence of air for its coagulation. Therefore, and chiefly from the last conclusion, it follows that air is not the general cause of coagulation of the blood. 3. *Influence of carbonic acid.* Scudamore admits that blood coagulates out of the body chiefly because it loses its carbonic acid, which in this theory is the substance that in the blood maintains fibrine in a liquid state. Sir Humphry Davy and his brother John made decisive experiments against this view. They found that blood exposed only to carbonic acid coagulates, though more slowly than when exposed to oxygen. Experiments of Brücke show also that the loss of carbonic acid by the blood is not necessary for its coagulation. 4. *Influence of motion and rest.* It has been said that blood coagulates out of the body because it is not in motion. If blood received in a bottle is agitated as soon as it flows from the vein, it usually seems to remain liquid; but if carefully examined, a great many particles of coagulated fibrine are found in it. When fibrine coagulates in this case, it cannot form long fibres, disposed in a kind of complicated network in the whole mass of the blood; in consequence of the agitation, it forms only small solid particles. The blood effused in the body, or kept in a blood vessel, between two ligatures, in a living animal, frequently does not coagulate, although it is not in motion. It seems, therefore, that rest is not the cause of coagulation of blood, either in the body after death or out of the living body. 5. John Hunter proposed an absurd theory of the coagulation of the blood; but as he grounds his view on interesting facts, although most of them are only partially true, we shall examine his theory. He observes: "My opinion is that it (the blood) coagulates from an impression; that is, its fluidity under such circumstances being improper, or no longer necessary, it coagulates to answer now the necessary purpose of solidity." Trying to prove this untenable theory, he says that when the vital principle of the blood is lost, it does not coagulate, which fact, he thinks, shows that coagulation is a vital action. Animals killed by lightning or by electricity, or those which are run very hard and killed in a state of exhaustion, or are run to death, have not their blood coagulated, according to Hunter. He also asserts that blows on the stomach killing immediately, and deaths from sudden gusts of passion, act in the same way, and by the same cause, *i. e.*, the loss of the vital principle. As regards death by electricity, Scudamore and Brown-Séquard have ascertained that blood coagulates after it, but the clot is not so hard as in other cases. Gulliver collected many facts to prove that blood may coagulate in all the circumstances mentioned by Hunter; but in most of these cases coagulation was very imperfect. It is extremely probable that blood is then altered in its composition, and chiefly in consequence of alterations in the nervous centres and in the muscles. 6. A view proposed by Zimmermann is quite in opposition to that of Hunter. According to the German chemist, blood coagulates because it putrefies when it is not submitted to the chemical influence of living tissues. This view is grounded chiefly on the fact that blood kept liquid by certain salts or other substances becomes at once or very quickly coagulated when a small quantity of putrefied matter is placed in it. This is certainly an interesting experiment, but it does not prove that coagulation depends upon putrefaction, and it seems strange that such a theory should be proposed by a man who knows that sometimes blood coagu-

lates in two or three minutes after having been drawn from a blood vessel. 7. Dr. B. W. Richardson of London some years ago obtained the great Astley Cooper prize for a paper on the cause of the coagulation of the blood, which he attributes to the separation from the blood of a principle which he thinks always exists in circulating blood. This principle is the carbonate of ammonia. The proofs of this theory are that the author has always found this substance given out by the blood at the time it coagulates, and that when this substance is kept by the blood it remains liquid. Zimmermann has published a paper to show: 1, that the discovery of the constant presence of ammonia in the blood belongs to himself; 2, that there are many facts which are in opposition to the view of Dr. Richardson. These views seem not only improbable, but in opposition to many facts. 8. We come now to the most probable cause of the coagulation of the blood, and the only one which in the present state of science has no fact against it, and seems, on the contrary, to agree with all the facts. This cause is a negative one; it is the absence of a peculiar influence on the blood that, according to the theory, produces, or rather allows coagulation. It is supposed that fibrine naturally tends to coagulate, and that some peculiar influence of the living tissues prevents its doing so. Sir Astley Cooper, Thackrah, and others, have been led to consider this view as probable. They found that blood kept an hour in a vein, between two ligatures, was still fluid, while it coagulated in from two to four minutes when extracted from the vessel. Gulliver has seen also that blood is very slow to coagulate when confined in a vein of a living dog. Brown-Séquard has found blood still liquid, after many months, in the veins of dogs, where it had been confined after the application of two ligatures, and he has ascertained that this blood coagulated in a few minutes after having been abstracted from the veins. It is well known that blood effused everywhere in the body frequently remains liquid, and also that in leeches it sometimes does not coagulate, while in all these cases as soon as the liquid blood is separated from the living tissues it becomes solid. Coagulation is slow even in the blood vessels and heart of a dead animal or man. But all these facts lead only to the conclusion that a peculiar influence of tissues and organs during life, or a little after death, has the power of preventing coagulation; they do not show what is this peculiar influence. Thackrah thought it was the vital or nervous power of the tissues. Brücke has shown that even when the heart has lost its vital properties, it keeps the blood fluid, and he has arrived at a theory which we do not think yet fully proved. He maintains that there is no such thing as liquid fibrine in liquid normal blood, and that coagulated fibrine is the result of an atomic change in some part of the albumen of the liquor sanguinis. We will conclude our examination of the facts and theories concerning the cause of the coagulation of the blood, by saying that there is in the blood vessels, and in the heart, and also in other tissues, some physical or chemical influence which maintains the blood fluid, and that when this influence is removed the blood coagulates. Schroeder van der Kolk had imagined that coagulation of the blood was prevented by an influence of the cerebro-spinal nervous centres on the blood through the blood vessels, and he thought he had proved the correctness of this view in finding that when he destroyed the brain and the spinal marrow, coagulation quickly took place in the blood. But Brown-Séquard has found that the destruction of the spinal marrow in the whole length of its lumbar enlargement, in birds and cats, not only did not produce coagulation of the blood, but did not immediately kill the animals, many of which have lived many months after the operation. When the arteries or veins are changed in their structure by an inflammation or other disease, they lose their power of preventing coagulation. 9. Coagulation is hastened or immediately determined by certain substances. J. Simon has seen it take place on threads kept in the current of blood in veins and arteries in living animals. Dupuy and De Blainville have seen coagulation quickly produced in blood after the injection of cerebral matter. H. Lee has seen the same thing after injection of pus, and Virchow and others after injection of mercury and other substances. Iodine and iodides and galvanic currents hasten coagulation, and have been employed, on account of their influence on blood, for the cure of aneurisms. 10. Coagulation is retarded or entirely prevented by certain substances. Neutral salts act in this way, as well as many medicines and poisons, such as opium, belladonna, aconite, hyoscyamus, digitalis, strong infusions of tea and coffee, &c. Gulliver has kept horses' blood liquid for 57 weeks by the influence of nitre, and this blood rapidly coagulated when it was diluted with water. This fact explains how in some cases blood does not coagulate in the body after death. So it is particularly after drowning, or death by irrespirable gases, or poisoning by cyanhydric acid, &c. But if the following fact, mentioned by Polli, be true, it is possible that, in some of those cases where blood has been found fluid in the veins long after death, the coagulation would have been observed taking place at a later period if the blood had been kept long enough. Polli says he has seen blood remain liquid a fortnight and then coagulate spontaneously, and he thinks that blood will always be found to coagulate if kept long enough. 11. The surface of a clot of blood very often presents a more or less considerable layer of coagulated fibrine nearly free from red corpuscles, and consequently without color; this layer is what is called the buffy coat. We owe to Gulliver the

explanation of the production of this coat. The red corpuscles have a density superior to that of the liquor sanguinis, and when the blood is at rest they naturally sink until an obstacle prevents their doing so. As long as coagulation has not begun, the globules move toward the bottom of the vessel; and when fibrine forms the solid shreds which constitute the coagulum, the upper layer of the mass of the blood no more contains red corpuscles, and therefore is colorless. Now, in inflammation the sinking power of the red globules is increased, so that the colorless layer of coagulated fibrine is thicker than in other cases, and thus it is that the buffy coat and its thickness are sometimes a good indication of the existence and even of the degree of an inflammation. But there are many circumstances besides inflammation and without it which lead to the production of the buffy coat. Andral has shown that when the proportion of red corpuscles is diminished in the blood, the buff exists frequently on the top of a small clot. This is the case in chlorosis, in anæmia, &c. Another circumstance which favors the formation of a colorless layer of coagulated fibrine is the aggregation of the red corpuscles in columns or piles (like piles of coin), which renders them heavier and increases their speed in sinking. In inflammation, as shown by H. Nasse, Wharton Jones, and others, the red corpuscles have an increased tendency to aggregate, and this explains why the buffy coat is so frequently thick in inflammation. Lehmann has shown, however, that all the circumstances which have been considered as favorable to the sinking of the red corpuscles, and to the formation of the buffy coat, are insufficient to explain the facts in all cases, and that there are some unknown causes of production of the buff. 12. The coagulation of blood does not generate heat, as has been imagined. The experiments of John Davy, and especially those of Denis, afford convincing proofs in this respect.

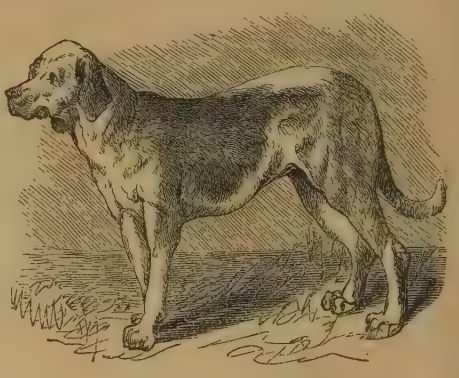
VI. Formation of the Blood. We shall not examine here the first formation of this liquid, that is, its production in embryos; this subject belongs to the article Embryology. We shall only inquire into the sources of the blood, and the mode of production of its principal materials, in completely developed animals. Three sources exist for the formation of the various materials composing the blood: 1, the body; 2, the food; 3, the respiration. That the body itself is a source of blood we cannot doubt. If, as Piorry has shown, we take blood from a dog in such quantity that we cannot abstract one or two ounces more without killing the animal, we find the next day, although the dog has not been fed, that we may take out again 10 or 12 ounces of blood without causing death. It follows from this fact that a formation of blood has occurred, and, as there has been no food taken, the blood formed must come from the body. As regards the share of respiration in the formation of blood, we shall only remark here that it gives certain gases, especially oxygen. For more details on the influence of oxygen and other gases on the blood, see Respiration. The formation of blood is very rapid when abundant and very nutritive food is taken, as is proved by the following facts, most of which are related by Haller. For several years a young girl was bled sometimes every day, at other times every other day; a hysterical woman was bled 1,020 times in 19 years; another individual had a loss of 1,000 lbs. of blood in a year; in another, 5 lbs. of blood were lost every day for 62 days; a young man had a loss of 75 lbs. of blood in 10 days; an Italian physician, Dr. Cavalli, relates that a woman was bled 3,500 times in 28 years! It seems from these facts, and from many others, that the power of formation of blood increases with the frequency of the losses of this liquid, and with the habit of repairing these losses. The food, before being able to repair the losses of blood or to give to this liquid the materials which it furnishes to the tissues, must be modified by digestion, and brought to the blood by absorption, either directly or by the lymphatic vessels. The part of the food absorbed by these vessels is called chyle. The transformation of lymph and chyle into blood is an act of much greater magnitude than was formerly supposed. According to the researches of Bidder and Schmidt, there is about 28·6 lbs. of lymph and chyle poured into the blood of a man daily, *i. e.*, from one sixth to one seventh of the weight of the body. Of this amount 6·6 lbs. are true chyle, and 22 lbs. are true lymph. In these two liquids elements similar to those of the blood are found: *i. e.*, water, salts, fats, albumen, fibrine, and corpuscles. This shows that the work of formation of blood from chyle, as well as lymph, is not very considerable; in other words, the transformation of food into blood is already much advanced in the bowels and in the lymphatic vessels. One of the most interesting questions relative to the formation of the blood is that of the origin of the blood corpuscles. In the first place, as regards the colorless corpuscles of the blood, there is now no doubt that they are entirely similar to the lymph corpuscles, and that they have been brought into the blood with the lymph and chyle. As regards their formation, see Lymph. The source of the albumen of the blood is chiefly the food, and it is brought into the circulation by direct absorption by the veins in the stomach and bowels, and only partly by the chyle. The origin of the fibrine of the blood is not exclusively the food, as some physiologists maintain. It must come from the tissues or from the albuminous matters of the blood, for Brown-Séquard has proved that when blood deprived of fibrine is injected into the arteries of a limb, the veins give out blood containing fibrine, and in greater quantity if the limb is galvanized. Besides, it is known that in animals deprived of food, or bled many

times, the quantity of fibrine increases in the blood. There must be a very considerable formation of fibrine in the blood, as, according to the remarks of Brown-Séquard, there are many pounds of this substance transformed into other substances, in the course of a day, in the liver and the kidneys. The origin of the fats of the blood, as Persoz, Liebig, Bidder and Schmidt, and others, have well proved, is not exclusively from the fats of the food. But it remains to be shown from what principles of the food or of the blood, and in which organ, the formation of fat takes place. Many of the extractive substances of the blood are either formed in it or in the tissues. As to the salts and the metals of the blood, they come from the food. The sugar of the blood comes in a great measure from the food, and from a transformation of certain substances by the liver.

VII. Uses of the Blood. Nutrition—that is, the act by which the various tissues grow or are maintained alive, and by which they excrete materials which are no longer useful to their organization and vital properties—is the result of the interchange between the blood and the tissues. We will now examine how far some elements of the blood may influence the vital properties of the tissues, to show that these properties depend upon some materials furnished by the blood. Brown-Séquard has discovered that all the nervous and contractile tissues in the brain, the spinal cord, the motor and sensitive nerves, the muscles of animal or organic life, the iris, the skin, &c., may, after having lost their vital properties, their life, recover these properties again, and in some respects be resuscitated, when blood containing a great quantity of oxygen is injected into the arteries of all these parts. Still more, he has found that, when cadaveric or *post-mortem* rigidity exists in limbs of animals or men, oxygenated blood has the power of restoring local life in these parts. These experiments he has made on many animals, and on the arms of two decapitated men, in one 13, in the other 14 hours after decapitation. He has ascertained that black blood (which contains but a small amount of oxygen) has no power of regenerating the vital properties of the various tissues, and that the more blood corpuscles and oxygen there were in the blood employed, the quicker and the more powerful was its regenerating influence. Blood deprived of fibrine acted as well as blood containing fibrine, showing that fibrine is not a necessary material for the production of the vital properties of the various tissues. In one case he maintained local life for 41 hours in a limb separated from the body of an animal. For other facts relating to the uses of the blood, see Nutrition, Secretion, and Transfusion; for the circulation of the blood, see Circulation.

BLOOD, Thomas, an Irish adventurer, generally known as Colonel Blood, born about 1628, died in Westminster, Aug. 24, 1680. He was a disbanded officer of Cromwell's army. In 1663 he formed a conspiracy to surprise the castle of Dublin, which was defeated by the vigilance of the duke of Ormond, the lord lieutenant, and some of the conspirators were executed. Blood escaped to England, determined to be revenged upon the duke. One night in 1670 he seized the duke while riding in his coach through St. James street, London, bound him on horseback behind an accomplice, and declared that he would hang him at Tyburn. The duke was finally rescued by his servants. In 1671 Blood nearly succeeded in carrying off the crown and regalia from the tower of London. It was now for the first time discovered that he was the perpetrator of the assault upon Ormond. Charles II., at the instigation of Buckingham, who is supposed to have employed Blood, granted the felon an interview, and not only pardoned him, but gave him an estate in Ireland of £500 a year, and made him a special favorite. Blood enjoyed the pension for 10 years, but, being charged with circulating a scandal against the duke of Buckingham, was held to bail, and died in his own house before the trial came on.

BLOODHOUND (*canis familiaris*), a hound trained for the pursuit of men, wounded animals, or beasts of prey. The bloodhound is not peculiarly ferocious, as its name would imply, and will hunt any other game to which he is trained as readily as he will man; and many other dogs may be trained more or less perfectly to follow the scent of man, as must be evident to every one who has seen a lost dog, which when he comes upon the scent of his master's foot will follow it until he has found him. Any hound naturally pursues whatever he perceives to be prey; and the distinction of foxhound, staghound, harrier, boarhound, or the like, is only a matter of education and training, and not of natural instinct. The bloodhound originally, of the old Talbot or southern breed, was larger than the foxhound, tall, square-headed, slow, with long pendulous ears, heavy drooping lips and jowl, and a stern and noble expression. He was broad-chested, deep-tongued, and in pursuit so



Bloodhound (Canis familiaris).

slow that a horse could always keep him in sight, and in a long chase an active pedestrian could keep him in hearing. His powers of scenting, however, were so extraordinary, that not only would he follow the deer or other animal of which he was in pursuit through herd after herd of the same animals, but he would recognize its trail on the ground as long as 12 or 14 hours after the creature had passed by; and if it were lost on one day, and he were put on its fresh track again on the following morning, he would follow it so long as it ran on solid soil. This animal was called the bloodhound for two reasons: First, if the animal he pursues be wounded and its blood spilled on the earth, he will follow the track of the blood, as he will that of the foot. Secondly, if fresh blood of some other animal be spilled across the track of the animal pursued, the hound will stop confused on the fresh blood, and will follow the old scent no longer. On the frontiers of England and Scotland, probably first, and certainly longest and most systematically, were kept and trained bloodhounds, called in the northern patois of the borders sleuth hounds; they were nothing more than the large Talbot, trained exclusively to follow cattle-stealing outlaws and marauders. The breed is still maintained in a few large deer parks in the north of England, for following up outlying bucks, which they will single out of the herd, and never leave until they are taken. In color they are usually tawny, not brindled, with black muzzles; or black and tan, the latter being called St. Hubert's breed, and esteemed the hardiest.—The animal known as the Cuban bloodhound is not a bloodhound, but is a descendant of the mastiff, crossed probably with the bulldog. It was trained by the Spaniards at first to pursue Indians, and was afterward employed in the capture of fugitive negroes. It has some scenting powers, but it is as inferior in these to the true bloodhound as it is superior to him in bloodthirstiness and cruel, indiscriminate pugnacity. It has no utility except as a man-hunter. This is the variety once occasionally used in the southern states in the pursuit of fugitive slaves. The large Russian greyhound, which has a cross of the bulldog, possesses considerable powers of scent, and has often been employed for the same purposes as the bloodhound.

BLOODLETTING, or **Phlebotomy** (Gr. *φλέψ*, a vein, and *τέμνειν*, to cut), the act of opening a vein for the purpose of withdrawing blood, as a means of relief in certain cases of diseased action in the organism. Bloodletting is usually performed at the bend of the arm, because the superficial veins are large in that locality, and more distinctly seen than anywhere else. Before using the lancet the surgeon ascertains the position of the artery at the bend of the arm; it is commonly felt pulsating nearly under the largest vein. This vein must be avoided, because of the danger of wounding the artery by passing the lancet too deeply. The vein next in size, but not so near the artery, is therefore selected. A bandage about two fingers in breadth and a yard in length is tied firmly round the arm, about an inch above the place where the opening is to be made. This will cause the veins to rise; but care must be taken not to tie the bandage so tightly that the pulse cannot be felt at the wrist. The surgeon then grasps the elbow with his left hand, placing his thumb firmly upon the vein, a little below the place where he intends making the puncture, to keep it in its place, and prevent it from rolling under the skin during the operation. The lancet is then passed obliquely into the vein. The flow of blood is facilitated by keeping the hand and wrist in motion. When a sufficient quantity has been discharged, the bandage is removed from the arm above the puncture; the surgeon puts his thumb upon the wound to stop the bleeding, and with the other hand washes the blood from the arm. The lips of the wound are then placed in contact; a small compress of old linen is placed over it, and secured by a bandage passed round the elbow in the form of the figure 8. The crossing of the bandage should be immediately over the compress. If blood should make its way through the linen some time after the arm has been bound up, the bandage must be made more tight, and slackened somewhat after the bleeding has ceased. The bandage is retained two or three days, and the arm is kept in a sling, for rest, at least 24 hours. In fat people it is sometimes very difficult, or perhaps impossible, to render the superficial veins of the arm visible; in such cases blood may be drawn from the ankle. A bandage is applied round the leg about two inches above the ankle; the foot is immersed some time in warm water, to make the veins rise; the largest vein either on the inside or the outside of the ankle is then opened, and the foot is again plunged into warm water, or the blood would not run freely. Bleeding at the wrist is also resorted to, when the veins at the bend of the arm are too small or otherwise difficult to operate upon; the cephalic vein of the thumb or the back and outer side of the wrist is selected in that case. Bleeding at the neck is also practised at times. In this case the operation is performed on the external jugular vein, at either side of the neck. The vein runs in an oblique direction, and the incision is made at the lower part of the neck, because the vein is there more prominent, and higher up it is surrounded by a network of nerves which it would be dangerous to wound. In addition to the usual materials, a card is required in this operation to form a channel for the blood. Two or three pledgets are placed, one upon the other, on the jugular vein, at its lowest part, just above the collar bone. These are maintained in place by a ligature, the centre of which is placed directly upon them, while the two ends are carried down, the one forward, the other backward, to the opposite armpit, where they are tied in a single bow. The vein then

swells, and should be fixed by two fingers of the left hand. Beneath the skin of the neck, and lying upon the jugular vein, there is a muscle as thin as paper, the *platysma myoides*, the fibres of which run in an oblique direction from the collar bone to the border of the lower jaw, which is the direction of the vein itself; the incision is made at a right angle with respect to the direction of these fibres, that they may contract and form no obstacle to the issue of the blood. It is also made rather wide, to insure a free issue from the vein. The blood trickles down, and the card is used to direct it into the vessel of reception. To encourage the flow of blood the patient moves the lower jaw, as in mastication, now and then taking a deep breath. When the bleeding is ended, a bit of adhesive plaster is applied over the orifice, and a pledget placed upon it, which is maintained in place by a ligature wound closely, not tightly, round the neck, and fixed with a pin. Bloodletting at the neck is neither difficult nor dangerous, and is performed at times in cases of congestion of blood in the head, as in apoplexy, asphyxia from hanging, &c.—Bloodletting is much less frequently practised now than formerly, and some medical practitioners repudiate the practice altogether; but the most eminent physicians, who combine a scientific education with many years of practical experience in the best hospitals of Europe and America, still recognize the necessity of bloodletting in some cases, as a means of producing immediate results of a salutary nature, where the life of the patient would be endangered by delay. Physiology forbids the loss of blood on all occasions of trifling indisposition, especially in feeble constitutions and in city populations, as was formerly of frequent occurrence in medical practice. Both leeching and general bleeding are practised now more cautiously than formerly; and cupping, as a substitute for leeching, is practised with the same discretion by well educated physicians.

BLOOD MONEY, money paid to the next of kin of a man who met with his death at the hands of another, accidentally or with premeditation. It secured the murderer and his relations against retaliation by the relatives of the deceased. The Greeks called it *ποινή*, the Latins *pœna*, the Franks, Alemanni, and Scandinavians *manbote*, *wehrgeld*, or *wyrgilt*, the British Celts *saarhard*, and the Irish Celts *eric*. The Arabs call it *diyeh*. The institution still flourishes in many communities of Asia and Africa. Among the Arabs the blood money varies in different parts of the country from 1,000 dirhems of silver (about $150) to 10,000 ($1,500). The price for a woman is about one third of that for a man, or somewhat more. If pregnant with a male child at the time of the murder, the murderer or his relations pay the full price of a man and woman; if with a female child, then the full price of two women. —In English criminal law the term blood money was also applied to rewards offered by statute to informers against highway robbers, thieves, burglars, and utterers of false coin or forged bank notes. Such statutes, however, were found to tempt evil-disposed persons to make a living out of these laws by entrapping unwary and foolish people into the commission of crime, and they have consequently been repealed.

BLOOD RAIN, a shower of grayish and reddish dust mingled with rain, which sometimes falls on vessels off the Atlantic coast of Africa and southern Europe. The dust of these showers has been ascertained by Ehrenberg to be largely made up of microscopic organisms, especially the silicious shells of diatoms; in a shower which fell at Lyons in 1846, he estimated the total weight at 720,000 lbs., of which one eighth, or 90,000 lbs., were these minute organisms. Figures of many of these may be seen in Dana's "Geology," under "Dynamical Geology." Darwin describes a shower near Cape Verd, which was at least 1,600 miles wide, covering an area of more than 1,000,000 square miles, and extending more than 1,000 miles from the coast of Africa. Lesser showers have fallen in Italy, reddish snow at the same time appearing on the Alps. The red color is owing to the presence of a red oxide of iron. One of the earliest of these showers is referred to in Homer's Iliad. The origin of the dust is not known; possibly it is extra-terrestrial. The species, of which over 300 have been made out, are not African; a few resemble South American. According to Dana, the zone in which these showers occur covers southern Europe and northern Africa, with the adjoining portion of the Atlantic, and corresponding latitudes in western and middle Asia.

BLOODROOT, the root of the *sanguinaria Canadensis*, called also red-root. This is an herbaceous perennial plant belonging to the poppy family, growing abundantly throughout the United States in rich soils and shady situations, and flowering in March and April. The rootstock or rhizome extends horizontally beneath the surface a few inches in length, and of the size of the finger. It sends forth side shoots, from the ends of which, as well as from that of the main root, rise the scape and leaf stalks, surrounded by the sheath of the bud, all of which spring up together. The leaf is heart-shaped, but deeply lobed, yellowish green on the upper surface, paler on the under, and strongly marked by orange-colored veins. The scape is round and straight, from a few inches to a foot in height, and terminated by a single flower of about eight petals, which are white, but sometimes tinged

with rose or purple. All parts of the plant are pervaded by an orange-colored sap, of deepest color in the root. They all possess the same medicinal qualities, but the root only is

Bloodroot (Sanguinaria Canadensis).

made use of. This is dried and pulverized, and is administered while fresh, either in the powder, or in pills prepared from it for the purpose of avoiding the irritating effect of the powder upon the throat, and also in infusion or decoction and tincture. Its properties are those of an acrid narcotic and emetic, in overdose producing violent thirst, faintness, and dimness of vision. In some cases its effects have been fatal. Upon fungous surfaces it acts as an escharotic. It has been found useful in numerous diseases, among which are typhoid pneumonia, catarrh, scarlatina, rheumatism, jaundice, dyspepsia, &c. Many physicians have long relied upon it wholly for the cure of croup. Its active properties appear to reside in a peculiar alkaline principle called sanguinarine, which is separated in the form of a white pearly substance. This has an acrid taste, and forms with the acids salts, all of which, when dissolved in water, produce beautiful red colors.

BLOOD STAINS. Various medico-legal questions are often to be solved concerning the nature of stains resembling those made by blood. The principal of these are: 1. Is it possible, and by what means, to decide that a stain is produced by blood or not? 2. Is it possible, and by what means, to ascertain that the blood of a stain comes from a man or from an animal? 3. Is it possible to find out whether the blood of a stain comes from one man or another? I. It is usually easy to ascertain whether a stain is due to blood or not, either by the chemical test of reagents or the physical test of the microscope. The latter is the more decisive, but a complete medico-legal examination must comprise both of them. If there is a stain of suspected blood on a piece of cloth, or any other stuff, the stained part must be cut off and dipped into a small quantity of distilled water. In the course of a few hours the coloring matter, if it is that of blood, will detach itself and reach the bottom of the vessel, the supernatant fluid remaining tolerably clear or slightly rose-colored. The fibrine will remain attached to the stuff as a grayish or rosy-white substance. If the liquid be boiled, the color will be destroyed and the albumen coagulated; in its inferior parts, where the coloring matter has accumulated, the liquid will become grayish or greenish, while the upper portion will acquire a slightly yellow tint. The red soluble dyes, or stains from the juices of fruits, are very rarely coagulated, and they do not lose their color when, after having been dissolved in water, the solution is boiled. Besides, they are rendered crimson or green, passing sometimes to violet, when treated with ammonia, while this reagent, unless it be used in great quantities and concentrated, does not change the color of blood or of a watery solution of a blood stain. When ammonia is powerful enough to alter the color of blood, it gives it a brownish tint, instead of the crimson, green, or violet colors that it gives to dyes. If the solution of a blood stain has coagulated by boiling, we find that potash dissolves the coagulum, rendering it limpid and green by reflection, and pink by refraction. If chlorhydric acid is then added, the transparency disappears, but it returns if another quantity of potash is added. These reactions belong only to blood. The nature of the smallest stain, able only to furnish one drop of a solution, may be found out by the above-mentioned chemical means. In such circumstances, according to Boutigny, the drop should be thrown into a silver spoon at a very high temperature. The liquid in this, as in any other case, *i. e.*, with any kind of liquid whatever, being suddenly exposed to an extreme heat, instead of evaporating takes the shape of a sphere, and then experiments may easily be tried, and the action of ammonia, of potash, of chlorhydric acid, &c., may rapidly be ascertained.—The microscope usually shows more quickly and positively than chemical reagents whether a stain is due to blood. With the help of this instrument the red and the colorless corpuscles may be seen easily. (See Blood.) There is nothing to be found with the microscope in the stains of the various dyes which can in any way be mistaken for the blood corpuscles. The presence of these well characterized particles in a stain is therefore an incontestable proof that it contains blood. But the blood corpuscles may have become so much altered that it is very difficult to ascertain their presence, at least without the help of chemical reagents. The microscope, unaided by chemistry, therefore, may fail to detect blood in old stains. However, it is usually easy to find the red corpuscles, and they have been detected in stains of many years' duration. Dr. Tay-

lor says that he has obtained clear evidence of their existence in a small quantity of blood, which had been kept in a dry state for three years. Dr. Charles Robin has discovered the presence of red corpuscles on clothes in stains of eight or ten years' duration. Prof. Jeffries Wyman says that in blood which had been allowed to dry in masses he has failed to find the red corpuscles, while, on the contrary, the white or colorless corpuscles may be softened out after they have been dried for months, and their characteristic marks readily obtained. He found it easy to detect them in blood which had been dried for six months. Dr. Robin has given a drawing representing what the microscope showed in a solution of a stain found on the blade of a knife. No red corpuscle is figured, while on the contrary many colorless ones are. But the mere fact of the presence of colorless corpuscles, with nearly the same appearance that they have in fresh blood, is not sufficient to prove that a stain is due to blood, because the chyle and lymph corpuscles, those of pus, and even some of those of mucus, are similar to the white corpuscles of the blood. When clothes have been washed after having been stained with blood, nearly or quite all the corpuscles are removed, or so much altered that their presence cannot be ascertained positively. But chemistry may then render it very probable that there has been blood on such clothes, by detecting in them iron and a coagulable organic matter. If blood stains are on the blade of a knife, the microscope and chemical reagents may enable us to distinguish them from rust. Usually, when the knife is heated, a blood stain may be peeled off, leaving a neat metallic surface where it was; it is not so with rust, which remains almost unaltered. Besides, when the stain is washed, it leaves a much smoother surface if it is due to blood than if it comes from rust. Usually in this latter case there is a peculiarly dentated surface, the presence of which leaves no possibility of a mistake. In a case where Daubrawa was requested to ascertain the existence of blood stains on a knife which was suspected to have been used in the commission of a murder, this instrument, having lain a long time in a damp place, was rusted, but there were certain bright spots free from rust, and surrounded by it. On heating the point of the blade these spots scaled off, while the rust remained adherent; and on immersing the knife in diluted hydrochloric acid, the bright spots remained unaltered while the rust readily dissolved. Some of the reagents which serve to detect blood were then employed, and it was found that the bright spots were really covered with blood, which had prevented the formation of rust. In another case in which a man had been accused of murder, an examination of a knife covered with red spots, and found concealed behind a piece of furniture, proved that the stains were due to rust produced by lemon juice. Blood may be detected even on a stone. Prof. Lassaigne ascertained its presence a full month after it had been shed on a pavement of soft freestone, which had been exposed to the action of air, of rain, and of the sun. The color of the stain had passed to a dirty green, with a reddish tint hardly discernible. In a place where stains of blood are suspected to exist, and where none are found by daylight, the search for the red spots must be made by artificial light. In a case where Ollivier d'Angers had vainly tried by daylight to find stains of blood on the floor and on the paper hangings of a room, he detected many by candlelight. II. When it is decided that a red stain is due to blood, it remains to be ascertained if the blood is that of a man or of an animal. Chemistry in such an examination is of little avail. The physical character of the red corpuscles of the blood is almost the only guide. It has been said, however, that some reagents may develop in the blood such a smell that it is easy to determine not only from what animal the blood comes, but also whether it is that of a man or of a woman. When sulphuric acid is added to the blood of an animal or of a man, it gives rise to a smell which has been said to be just the same as that of the individual that furnished the blood. The chemist (Barruel) who discovered this fact was almost always able to make out by this means what was the source of blood sent to him; so were Colombat and some other physicians; but decisive examinations have shown that very few have the organ of smell sensitive enough for this purpose. In man and all the mammalia (except the camel tribe), the red corpuscles are circular, flat disks, while in most fishes, in reptiles, birds, and camels, they are oval. In a case mentioned by Taylor, it was suggested in the defence that the blood stains on the clothes of the prisoner were due to his having killed some chickens. The shape of the globules negatived this part of the defence. In another case the blood was alleged to be that of a fish; this was also disproved by the shape of the corpuscles. Dr. H. Bennett of Edinburgh states that a patient having bronchitis had put bird's blood in her sputa, and that after the microscope had shown this fact she was greatly surprised that it had been discovered, and confessed that she had done it for the purpose of imposition. On looking at the table of the dimensions of the blood corpuscles (see Blood), it will be found that the blood disks of man are larger than those of all the domestic animals. To cover the extent of a linear inch requires 3,200 of the red corpuscles of a man, 4,404 of those of a cat, and 6,366 of those of a goat. C. Schmidt thinks he has shown that by accurate measurements of the red corpuscles, the blood of all the common mammalia can be individually detected and also distinguished from that of man. He proposes to avoid the errors arising from a greater or a slighter evaporation, by drying the blood corpuscles before measuring them. He gives the following table:

DIAMETER OF BLOOD CORPUSCLES IN MILLIMETRES.

	Mean.	Minimum.	Maximum.
1. Man	0·0077	0·0074	0·0080
2. Dog	0·0070	0·0066	0·0074
3. Rabbit	0·0065	0·0060	0·0070
4. Rat	0·0064	0·0060	0·0068
5. Pig	0·0062	0·0060	0·0065
6. Mouse	0·0061	0 0058	0·0065
7. Ox	0·0058	0·0054	0·0062
8. Cat	0·0056	0·0053	0·0060
9. Horse	0·0057	0·0053	0·0060
10. Sheep	0·0044	0·0040	0·0048

Dr. Taylor says he has tried the method of Schmidt and has not found it practically available, and he declares that the question of the distinction between the blood of man and that of certain animals is unsolved. He adds that when blood has been dried on clothing, we cannot with certainty and accuracy distinguish that of an ordinary domestic animal from that of man. Usually, however, in fresh blood, the measurement of the red corpuscles will decide the question; and in old stains, when the blood corpuscles have changed their form and become jagged or stellate, it will often occur that several substances will give them their normal shape and render possible the determination of their source. But the evidence here is based on conjecture only, and should therefore be received with the greatest caution. Not only can the red corpuscles be altered in their size and shape, but they may be decomposed and give origin to crystals which are so similar, whether coming from the blood of certain animals or that of man, that no distinction is possible. Fortunately there are almost always at least a few undecomposed red corpuscles among the crystals. III. It is absolutely impossible to distinguish the blood of one man from that of another by means of the comparison of the red corpuscles. There may be more difference between the corpuscles of two samples of blood from the same man than between those of two men. A great many external causes may produce variations in the size of the red globules; and besides, the proportion of water and of certain gases or salts in the blood has a great influence on the shape and dimensions of the red corpuscles. All who know the facts advanced in favor of or against the theory of Henle, concerning the causes of the difference of color of the arterial and venous blood (see RESPIRATION), are aware of the changes of the blood corpuscles due to oxygen, carbonic acid, &c. The smell of the blood of women might by some persons be distinguished from that of the blood of men, but we cannot place any reliance on the senses of anybody for such a distinction; and we know that even Barruel, who discovered the influence of sulphuric acid in increasing the odor of blood, once failed to distinguish the blood of a man from that of a woman. Chemistry also is of no avail for the discrimination of the blood of one man from that of another.

BLOODSTONE, a variety of quartz, of a dark green color, having little red spots of jasper sprinkled through its mass. When cut and polished, the red spots appear like little drops of blood. It is somewhat prized as a gem.

BLOOMARY, a name sometimes given to a kind of furnace for the production of malleable iron from cast or pig iron, and sometimes to a similar furnace for the direct extraction of malleable iron from its ores. In both cases the lump of iron obtained, when finished under the hammer, is called a bloom, from the German *Blume*, a flower, because, it is said, the product is as it were the flower of the ore. The direct fabrication of malleable iron from the ore appears to have been practised from remote antiquity. The natives of India, Burmah, Borneo, Madagascar, and some parts of Africa practise the direct conversion of iron ores into metallic iron in furnaces which are rude bloomaries. In certain districts of India the amount of metallic iron thus produced is very considerable, and much of it is manufactured into steel; but the furnaces used are small in size and do not yield more than 30 or 40 lbs. of iron daily, with the labor of three or four men, and a great waste of ore and charcoal. The massive rich ore coarsely pulverized, or the grains of iron ore obtained by washing the sands in some places, are heated with charcoal in shallow open furnaces until reduced to the metallic state; but as the metal thus produced is infusible at the heat of these furnaces, it agglutinates into an irregular mass, known as a loup, which is afterward hammered and converted into a bloom. Somewhat similar methods of making malleable iron have long been known in various countries of Europe, where under improved forms they are still followed, and have thence been brought to North America. Of these furnaces for the direct production of blooms from the ore five forms are known in Europe, viz.: the Corsican and Catalan forges, the German bloomary forge, the Osmund furnace, and the German *Stückofen* or high bloomary furnace, which had high walls and approached in form the modern blast furnace, of which it seems to have been the immediate precursor. All of these employ a blast to increase the heat, but the name of blast furnace is technically given only to those furnaces in which by increasing the heat the reduced iron is subsequently carburetted and fused, being thus separated in the form of cast or pig metal from the melted impurities or slag, both of which are drawn off by tapping the furnace from time to time. The production of iron in this way is a continuous process, while in the various bloomary furnaces the operation is interrupted from time to time in order to remove from the hearth the accumulated mass of reduced but unmelted malleable iron, which is then freed from the slag or cinder by hammering. Of these furnaces the Corsican is the most primitive form, and is now nearly if not quite disused. It was said to consume more than 800 lbs. of charcoal in making 100 lbs. of iron.—The Catalan forge or bloomary is so called from the province of Catalonia in Spain, where it was

formerly much used, as well as in the neighboring parts of France, especially in the department of Ariége. The Catalan forge as used in France consists of a rectangular hearth constructed chiefly of heavy iron plates, and in the largest size measures 40 by 32 inches, and is from 20 to 24 inches deep, or from 12 to 15 inches below the tuyere or pipe through which the blast enters. In some cases, however, furnaces of not more than one half these dimensions are built. The pressure of the blast does not exceed 1½ or 1¾ inch of mercury, and the tuyere is directed downward at an angle of 30° or 40°. The wall facing the tuyere slopes outward toward the top, and in working the greater part of the charge of ore is heaped against it, and occupies from one third to one half of the cavity of the furnace, the remaining space being filled with ignited charcoal. The ore is previously broken so that the largest lumps are not more than two inches in diameter, while from one third to one half of the material will pass through a screen the bars of which are four tenths of an inch apart. This finer ore is thrown on the surface of the fire from time to time during the operation, which is conducted with many precautions as to regulating the blast, stirring, and supplying the fine ore and coal. At the end of six hours, in the ordinary routine, there is withdrawn from the bottom of the furnace an agglomerated mass of reduced but unmelted iron, which is then forged into blooms or bars. The operation consumes, in one of the larger-sized forges, about 9½ cwt. of iron ore (a limonite holding 40 or 50 per cent. of iron is treated in the Ariége) and 10½ cwt. of charcoal, and yields 3 cwt. of bar iron. According to another calculation, there are required in this process, for the production of 100 lbs. of iron, 340 lbs. of charcoal and 312 lbs. of an ore containing from 45 to 48 per cent. of iron. Of this about seven tenths are obtained in the metallic state, the remainder passing into the slag; 100 lbs. of the ore yield 31 lbs. of bar iron and 41 lbs. of slag, which is a dark-colored basic silicate, very rich in oxide of iron. It is to be remarked that in this direct method of treatment a portion of the oxide of iron is always consumed in fluxing the impurities of the ore, so that the purest ores are generally sought for the purpose. In the blast furnace, on the contrary, by the judicious use of lime or other basic fluxes, the slags are obtained almost free from iron, and the loss of the metal is thus avoided.—The German bloomary furnace was formerly used in Silesia and the Palatinate, and is described at some length by Karsten (1816), but is dismissed with a few words in Bruno Kerl's treatise (*Hüttenkunde*, 1864, iii. 427), from which its use would seem to be nearly or quite abandoned in Germany. According to Karsten, the German bloomary consists of an iron pot, or a box of iron plates, in either case lined with refractory bricks, and having an internal diameter of from 14 to 21 inches, and the same depth, the dimensions varying with the fusibility of the ore, the force of the blast, and the quality of the coal. The tuyere is horizontal. The furnace having been filled and heaped up with burning charcoal, the ore is thrown upon the fire by shovelfuls at a time, until a loup of sufficient size has been formed at the bottom of the hearth, as already described in the Catalan method. When the blast is too intense, or the coal very dense, it may happen that the reduced iron becomes carburetted by the excessive heat to such an extent as to produce a steel-like iron, or even molten cast iron, instead of a loup of soft malleable iron. A similar state of things sometimes occurs in the Catalan forge, and is occasionally taken advantage of to produce an imperfect kind of steel. From the above description it will be seen that the method by the German bloomary differs from that by the Catalan in the fact that in the latter the greater part of the charge of ore is placed at the commencement of the operation, in a coarsely broken state, on the sloping wall of the furnace, opposite the tuyere, while the remaining portion is subsequently projected in a more finely divided condition upon the surface of the fire. In the German method, on the contrary, the whole of the ore is reduced to this finer condition, and is added by small portions; a plan which dispenses with the charging of the furnace with ore after each operation, as in the Catalan method, and permits of a continuous working, interrupted only by the withdrawal of the loups from time to time.—The German bloomary in an improved form is extensively used for the reduction of iron ores in the United States, where it is known by the name of the bloomary fire, the Jersey forge, or the Champlain forge; it is also frequently called the Catalan forge, from which, as already shown, it is distinct in form and still more distinct in the manner in which it is worked. This latter seems however to be unknown, at least in the northern and eastern portions of the United States. The German bloomary was probably introduced into North America early in the last century. Among the forges in operation in New Jersey and Pennsylvania in 1856, Lesley, in his "Iron Manufacturers' Guide," mentions one as having been established in 1733 and another in 1725. The magnetic iron sands of the seacoast early attracted the attention both of the American colonists and of metallurgists in England, as appears from the experiments of Dr. Mohlen as early as 1742 upon what was called the Virginian black sand (the name of Virginia being at a still earlier period given to the whole coast from Canada to Florida). These black sands from Killingworth, Connecticut, were there successfully treated in a bloomary furnace in 1762 by the Rev. Jared Elliot, who obtained blooms of 50 lbs. weight of iron, which was afterward made into steel of superior quality, and for his discovery received the following year a medal from the society of arts of London. Steel works had at that time been

erected in Connecticut for the treatment of the metal thus produced, but were abandoned on account of an act of parliament forbidding the manufacture of steel in the British colonies. In the districts where it was first worked, including northern New Jersey and the adjacent parts of New York and Pennsylvania, the bloomary process has fallen into disuse since wood has become scarce, and extensive workings of coal in the vicinity, with great facilities for transportation, have rendered it more profitable to treat the ores in the blast furnace than in the bloomary fire. In northern New York, on the contrary, the use of the bloomary process has continued to extend within the past few years, and in 1868 the production of iron by this method in that region was estimated at nearly 40,000 tons, a large portion of which is consumed at Pittsburgh for the manufacture of steel by cementation, for which it is much prized. Two establishments in the vicinity of Keeseville had in that year respectively 18 and 21 bloomary fires, and the whole number in activity in Essex and Clinton counties in 1867 was said to be 136. It is only in mountainous regions, abounding in rich iron ores and wood suitable for charcoal, and still inaccessible to railways, that this process can hold its ground. Its advantages are, that the outlay and floating capital required are inconsiderable, and the consumption of charcoal comparatively small. The direct mode of reduction can only be applied to rich ores, which to yield good results in the German or Catalan bloomary should contain not much less than 50 per cent. of iron, while much richer ores are to be preferred. Two tons, and of the richest and purest ores 1½ ton, will under careful management yield one ton of blooms. The bloomary hearths used in northern New York vary in area from 27×30 to 28×32 inches, and in depth from 20 to 25 inches above the tuyere, and from 8 to 14 inches below. The sides are of heavy cast-iron plates, and the bottom, though often of beaten earth or cinders, is in the best constructed hearths also of iron, made hollow and kept cool by a current of water circulating through it. The side plates slope gently inward in descending, and rest on ledges in the bottom plate. A water box is let into the tuyere plate. The tuyere, which is inclined downward, has its opening in the form of a segment of a circle. In some localities these dimensions differ from those given; and the bloomaries lately erected at Moisie in the lower St. Lawrence, for the treatment of the magnetic iron sands, measure 32×30 inches, and have the tuyere nearly horizontal. The blast employed in the American bloomaries has a pressure of 1½ to 1¾ lb., and is heated to 550° or 600° F., by passing through inverted siphon tubes of cast iron placed in a chamber above the furnace. By the use of the hot blast the production of the furnaces is much increased, and a considerable saving of charcoal is effected without any deterioration in the quality of the metal. The working of these furnaces is conducted as follows: The fire being kept active and the furnace heaped with coal, the coarsely pulverized ore is scattered at short intervals upon the top of the burning fuel, and in its passage downward is reduced to the metallic state, but reaches the bottom without being melted and there accumulates, the grains agglomerating into an irregular mass or loup, while the earthy matters form a liquid slag or cinder which lies around and above it, and is drawn off from time to time through an opening in the front plate. At the end of two or three hours, or when a sufficiently large loup is formed, this is lifted by means of a bar from the bottom, brought before the tuyere for a few minutes to give it a greater heat, and then carried to the hammer, where it is wrought into a bloom; the bloomary fire itself being generally used for reheating. This operation being concluded, the addition of ore to the fire is resumed, and the production of iron is kept up with but little interruption. A skilled workman will with a large-sized bloomary furnace bring out a loup of 300 lbs. every three hours, thus making the produce of a day of 24 hours 2,400 lbs. of rough blooms. The consumption of charcoal is from 250 to 300 bushels, (weighing 16 or 18 lbs. to the bushel) for each ton of 2,000 lbs. of blooms produced. In addition to the cost of the ore and coal, which varies somewhat with the locality, the estimate of a competent iron master in northern New York in 1868 gave for wages $9, and for general expenses $3 50, for each ton of blooms produced.

—Several plans have been introduced having for their object the reduction of rich iron ores at low temperatures in close chambers by carbonic oxide, and the spongy metallic iron thus obtained was in many cases transferred at once to a hearth and converted into blooms. Such was the case in the methods of Clay, of Chenot, and of Renton. In the manufacture of blooms from cast iron by the Walloon method, now to a great extent superseded by puddling, the iron, generally purified by a first fusion in what is called a running-out fire, is brought in small portions at a time before the tuyere on a charcoal fire similar to the German bloomary fire just described, and known as a sinking fire. It there melts down and is at the same time decarbonized, the product accumulating in the bottom of the furnace in a loup, which is treated in the manner already described and yields a bloom of malleable iron. The iron thus obtained is superior in quality to that produced by puddling, and for the finer kinds of metal the process is still practised in some parts of the United States, and to a considerable extent in Sweden, where a modification of the bloomary known as the Lancashire hearth is employed. The loss in this process of conversion is considerable, and the consumption of charcoal in the production of the pig iron and its subsequent conversion in the bloomary fire is about equal to that required in the direct process.

BLOOMFIELD, Robert, an English pastoral poet, born at Honington, Suffolk, Dec. 3, 1766, died at Shefford, Bedfordshire, Aug. 19, 1823. At an early age he lost his father, a tailor, and was taught to read by his mother, who kept a dame school. Not being sufficiently robust for a farmer's boy, he was sent to London to learn the business of a shoemaker, and in his brief leisure read a few books of poetry, including Thomson's "Seasons," which he greatly admired. He composed in a garret where he lodged "The Farmer's Boy," in which he described the country scenes he had been familiar with in childhood. Several London publishers declined this poem, but it was seen by Mr. Capel Lofft, and under his patronage it was published in 1800. Within three years over 26,000 copies were sold, and it was translated into German, French, Italian, and Latin. The duke of Grafton appointed Bloomfield to a government situation, but ill health caused him to return to his trade of ladies' shoemaker, the duke settling a shilling a day on him for the rest of his life. Finally, he retired to Shefford, where he died in debt, leaving a widow and four children. His "Farmer's Boy," which has often been reprinted, is by far his best production. His other principal poems are: "Rural Tales and Ballads," "Good Tidings," "Wild Flowers," "The Banks of the Wye," and "May Day with the Muses."

BLOOMFIELD, Samuel Thomas, D. D., an English scholar and critic, born in 1790, died at Wandsworth Common, Sept. 28, 1869. He was educated at Sidney college, Cambridge, took orders, and held till the end of his life the vicarage of Bisbrooke, Rutland. He published, under the title *Recensio Synoptica*, exegetical, critical, and doctrinal annotations on the New Testament (8 vols., 1826); a Greek and English lexicon to the New Testament, revised and enlarged from Dr. Robinson's (1829); a translation of Thucydides (3 vols., 1829); Thucydides's "History of the Peloponnesian War," with a new recension of the Greek text and elaborate notes (2 vols., 1843); and "The Greek Testament, with English Notes, critical, philological," &c. (2 vols., 1832; 9th ed., 1855). Dr. Bloomfield's Greek Testament has been more largely used, both in England and the United States, than that of any other English critic, and is still highly approved as a learned, judicious, and trustworthy work.

BLOOMINGTON, a village and the capital of Monroe co., Indiana, situated on a ridge between the E. and W. forks of White river; pop. in 1870, 1,032. A railroad from New Albany to Michigan City passes through the village. It is the seat of the state university, which in 1871 had 13 instructors, 277 male and 31 female students, and a library of 5,000 volumes. The law school connected with it had 2 professors, 53 students, 229 alumni, and a library of 1,100 volumes.

BLOOMINGTON, a city and the capital of McLean co., Illinois, 116 m. S. S. W. of Chicago, and 154 m. N. N. E. of St. Louis; pop. in 1860, 7,075; in 1870, 14,590. The city is handsomely built, has street railways and steam fire engines, and contains 36 schools attended by 3,091 pupils, a female seminary, and the Major female college. The Illinois Wesleyan university, a Methodist Episcopal institution, was organized in 1852, and in 1870 had 200 pupils in all the departments, 6 instructors, and a library of 15,000 volumes. Three daily and two weekly papers are published. Bloomington is a great railroad centre, and is increasing rapidly in population and wealth. The Chicago, Alton, and St. Louis railroad and the northern division of the Illinois Central intersect at this point, which is also on the line of the Indianapolis, Bloomington, and Western railway. The construction and repair shops of the Chicago and Alton company are built of stone, and with the yards attached cover 13 acres of ground. The city also contains numerous mills and factories of all descriptions. A large wholesale trade is carried on, the city competing with Chicago and St. Louis for the patronage of the neighboring towns.

BLOUNT. I. A N. county of Alabama, drained by the upper courses of the Locust and Mulberry forks of Black Warrior river; area, about 900 sq. m.; pop. in 1870, 9,945, of whom 682 were colored. Portions of the surface are mountainous, and covered with forests of excellent timber. Blount's Springs, on Mulberry fork, is a popular watering place. The chief productions in 1870 were 47,375 bushels of wheat, 266,553 of Indian corn, 12,779 of oats, 31,578 of sweet potatoes, and 950 bales of cotton. There were 1,651 horses, 633 mules and asses, 3,235 milch cows, 5,323 other cattle, 9,507 sheep, and 15,983 swine. Capital, Blountsville. **II.** A S. E. county of Tennessee, bordering on North Carolina; area, 450 sq. m.; pop. in 1870, 14,237, of whom 1,456 were colored. Holston river, on the N. W. boundary, is navigable by steamboats; the Tennessee bounds it on the west, and Little river and numerous small creeks intersect it. The Knoxville and Charleston railroad extends from Knoxville to Marysville. The surface is traversed by several mountain ridges, the principal of which are Iron or Smoky mountain, and Chilhowee mountain. The soil is fertile and carefully tilled. Marble, limestone, and iron ore abound. The chief productions in 1870 were 107,819 bushels of wheat, 384,583 of Indian corn, 104,501 of oats, 18,178 lbs. of wool, 129,535 of butter, and 20,219 gallons of sorghum molasses. There were 2,847 horses, 2,488 milch cows, 5,018 other cattle, 10,828 sheep, and 15,725 swine. Capital, Marysville.

BLOUNT, Charles, an English deistical writer, born in Middlesex, April 27, 1654, died in August, 1693. His first work, a pamphlet in defence of Dryden's "Conquest of Granada," was followed in 1679 by *Anima Mundi*, a work giving a historical account of the opin-

ions of the ancients on a future life, and in 1680 by "Great is Diana of the Ephesians," and a translation of the Latin version of part of Philostratus's Life of Apollonius Tyanæus, with irreligious annotations, which were severely censured by Bayle. His tracts, "A Just Vindication of Learning and of the Liberty of the Press," and "Reasons for the Liberty of Unlicensed Printing," consisting chiefly of garbled extracts from Milton's "Areopagitica," and his reputed anonymous treatise "William and Mary Conquerors" (1693), which was designedly written in the spirit of ultra tories and churchmen, with a view of entrapping the censor Bohun, contributed much to inflame the public mind against the censorship of the press. After the premature death of his wife, a daughter of Sir Timothy Tyrell, he wanted to marry her sister, and wrote a tract in defence of such marriages; but, unable to overcome either the scruples of the lady or the prohibitions of the law, he inflicted on himself a fatal wound. According to Pope, he did not intend to kill himself, but only meant to frighten his sister-in-law into accepting him. Macaulay thinks he has been much overrated, but gives him credit for having greatly aided in the emancipation of the English press. Charles Gildon wrote an apology for his suicide, and published a collection of his letters under the title of "The Oracle of Reason" (1690), and "The Miscellaneous Works of Charles Blount, Esq." (1695).—His father, Sir Henry (1602–'82), was the author of "A Voyage to the Levant" (1636); and his elder brother, Sir Thomas Pope (1649–'97), who served in five parliaments, wrote *Censura Celebriorum Authorum* (fol., 1690), *De Re Poetica*, and a compilation on natural history.

BLOUNT, Thomas, an English writer, born at Bardesley, Worcestershire, in 1618, died at Orleton, Dec. 26, 1679. He published "The English Academy of Eloquence" (1654); a "Dictionary of Hard Words" (1656); "Lamps of the Law, and Lights of the Gospel" (1658); "Boscobel," a history of Charles II.'s escape after the battle of Worcester (1660; part 2, 1681); a "Law Dictionary" (1671); "A World of Errors Discovered in the New World of Words" (1673); and some works of less importance. He was a zealous Roman Catholic, and wrote a Catholic almanac and a catalogue of the Catholics who lost their lives in the king's cause. The popish plot and the anxiety occasioned by the excitement of the time are believed to have broken his health and caused his death.

BLOUNT, William, an American politician, born in North Carolina in 1744, died in Knoxville, Tenn., March 26, 1800. He was a delegate from North Carolina to the continental congress, and one of the signers of the federal constitution in 1787. In 1790 he was appointed governor of the territory south of the Ohio. After the formation from this territory of the state of Tennessee in 1796, he was elected one of its first senators in the national congress. In 1797 he was impeached by the house of representatives for having intrigued, when governor of the territory, to transfer New Orleans and the neighboring districts, then belonging to Spain, to Great Britain, by means of a joint expedition of English and Indians. He was expelled from the senate, and the process was then dropped in the house. The proceedings against him increased his popularity among his constituents, by whom he was elected to the state senate, of which he became president.

BLOW, John, an English composer, born at North Collingham, Nottinghamshire, in 1648, died in London in 1708. On the accession of Charles II. he became a chorister in the chapel royal, and, though only a child, composed several anthems. He afterward became successively one of James II.'s private musicians, master of the choir of St. Paul's, organist of Westminster abbey, and composer to the royal chapel. He published the *Amphion Anglicus*, a collection of songs and hymns. He was buried in Westminster abbey, and on his monument is engraved the *Gloria Patri*, one of his first canons.

BLOWING MACHINES. Besides the common bellows (see Bellows), a variety of other machines have been devised for the purpose of propelling air in large volume, or with great pressure and volume together. The most efficient of these machines are the blowing cylinders, which are used to supply air to blast furnaces, and by their great size and strength are made to furnish immense bodies of air under great pressures. Fan blowers are used for supplying large volumes of air, but for purposes in which a high pressure is unimportant. The water blowing machine, for which we have neither name nor use in this country, but which is well known in the mining regions of central and southern Europe by the name of *trompe*, is so ingenious, and may in some situations prove so valuable a contrivance, that it cannot be passed over without notice. There is also, in the same countries, a very simple blowing apparatus, used for ventilating mines, also too little known in this country, called the ventilator of the Hartz, which is well worthy of notice.—Blowing cylinders of the best construction are made of cast iron, the inner surface turned perfectly true, fitted with air-tight iron heads, each of which is furnished with a large valve, corresponding to the clapper of the bellows, opening inward. Through the centre of the heads the smooth iron piston rod moves in close packing, carrying a piston which is fitted accurately to the cylinder. As the piston moves in one direction, the air enters through the valve in the head behind it, while that in front is forced through an aperture on one side, which is furnished with a valve opening outward, and connects with a pipe leading to any desired point. By reversing the motion the end exhausted of air is refilled, while the

other, by the shutting of the valve through which the air entered, is made to furnish its contents through the side opening to the same main pipe, which connects with the other end. The principle of the machine is thus the same as that of the double-acting force pump for propelling water. By the alternate motion of the piston, a current of air is maintained of considerable steadiness, and of quantity and pressure according to the size of the cylinder and its valves, the rapidity of the movement, and the power applied. The pressure is equalized by the use of an air receiver of great capacity, into which the air is forced through a larger aperture than that for its exit; its elasticity is thus made to act as a perfect spring. For propelling the air into blast furnaces, the blowing cylinders are made of great size and strength. They are often set in pairs, upon horizontal frames of cast iron, the piston rods being connected with cranks geared to the main shaft of the steam engine. Two such cylinders, of 5 ft. diameter and 6 ft. stroke, afford at a common rate of running (as eight full strokes per minute), sufficient air for a first class furnace. No allowance being made for escape of air, and room occupied by the piston and rod, each movement of the piston should discharge the contents of the cylinder, which are 117·81 ft. A full revolution of the crank discharges it twice, and this being repeated eight times in a minute, the effect of the two cylinders is to drive forward 3,370 cubic feet every minute. Instead of being placed horizontally, a single blowing cylinder is sometimes used of great dimensions, placed upright, and the piston rod attached to one end of the lever beam of the steam engine, the steam cylinder connecting with the other end. Some are also connected by the same piston rod passing through the steam cylinder and blowing cylinder, without the intervention of either beam or gearing. —A fan blower is a short cylinder of cast iron, through the axis of which passes a shaft, made to revolve by a pulley attached to it outside of the cylinder. Upon the shaft within the box are placed four or five wings, which when rotating pass near to the inner surface of the cylinder. The apparatus, drawn in section, is like an undershot water wheel enclosed in a box. Around the axle, openings are left in the sides of the box for the admission of the air. This may for purposes of ventilation be drawn from a distance through air pipes discharging into the box. The motion of the wings carries the air around, and a new supply enters to be taken on by the next wing. The discharge is through a box or pipe placed at a tangent to the cylinder and opening into it. The bottom of this box forms the base upon which the apparatus rests; and in some machines, as this lower plate curves around to form the case of the blower, it is made to take a spiral form instead of that of a true cylinder, the radius of the circle lessening as the arc is produced. This is called the eccentric fan; the other, in which the revolving axis is in the centre of the cylinder, is the concentric fan. The latter is supposed to work to disadvantage by carrying around a portion of the compressed air a second time, while the wings of the other, revolving above the bottom of the discharge box, afford more room for the escape of the air, and at the same time cut off, as they pass into the upper portion of the box, and close to its inner surface, the entrance for any air from without. By the high speed at which the fans are made to revolve a large body of air is discharged through the aperture, but with little pressure. It is not unusual to run them at the rate of 1,800 revolutions per minute, and for the air at its discharge to have a velocity of 3,280 ft. in the same time. According to the statements of Dr. Ure, published in the "Philosophical Transactions," the velocity of the discharge is actually about three fourths of that of the extremities of the fan blades. If the effective velocity of these be 70 ft. per second, and the area of the discharge pipe be 3 ft., the quantity of air discharged is 210 ft., or 12,600 ft. per minute. The weight of this amount of air is about 969 lbs. For a heavy body falling to acquire a velocity of 70 ft. per second, the height of the fall must be 76·5 ft. This, multiplied by the number of pounds moved, and divided by 33,000, will give the horse power, which in this case is 2·24, required to produce this result. The pressure of the blast is rarely more than from one quarter to half a pound upon the square inch; hence the fan can only be used where no great resistance is offered to the blast. It is admirably adapted for blowing a large number of open fires, or for cupola furnaces. —The trompe is a machine dependent upon a current of water falling from a considerable height. It consists of a large pipe, about 2 ft. square, leading from an upper reservoir of water to a cistern or box, 25 to 30 ft. or more below it. A few feet under the cistern, the pipe is contracted in the shape of a funnel in order to divide the water into many streamlets in its fall. Below this narrow place are a number of holes through the pipe for the admission of air. This is taken down by the water as it descends, and passes into the middle of the cistern at the bottom, where a block is placed, upon which the water dashes, causing the air to separate from it. The water passes through a hole in the bottom of the cistern into a side box, in which is placed a valve for checking the exit of the water, that the air which collects in the upper part of the cistern may be kept at any desired pressure. From the top of the cistern a small air pipe conveys the blast to any required point. This apparatus is used for furnishing air to cupelling and melting furnaces.—The ventilator of the Hartz is an apparatus of great simplicity, designed to be connected with any part of the machinery about mines that will give a slow alternating motion, and which is usually kept in action, the object being to furnish a continual supply

of air to mines. Two cylindrical-shaped vessels, such as long casks, are selected, of such sizes that one, when inverted, may easily move up and down within the other. The outer one is nearly filled with water, and is furnished with an air pipe, which leads from its upper part through the water, and through its bottom down into the mine. Upon the upper end of this pipe is a valve opening downward. The inner inverted cask surrounds this pipe. It has upon its upper end a large valve opening within. Being suspended by a chain to the end of a lever beam, or to the arm of a bob, air passes within as it is lifted up, and is propelled as it descends through the pipe. By this alternating motion a continual current of air is supplied with little cost of power or attention. A more perfect arrangement of this machine is in making it double, by attaching one to each end of the lever beam. For blowing furnaces these machines have the common disadvantage of all water blasts, that they cause the air to take up more or less moisture, which is discharged into the furnace, and must to some extent diminish the effect of the blast.

BLOWPIPE, in the simplest form, a small metallic tube of tapering shape, its smaller end curved around to form a right angle, and the larger end of convenient size for applying to the mouth, designed to concentrate the heat of a flame upon a particular point. It is 8 or 10 inches in length, with a bore varying from $\frac{2}{10}$ to $\frac{1}{10}$ of an inch, but drawn out at the small extremity to a very minute aperture. Through this air is blown upon the flame of a lamp, causing a portion of the flame to be diverted in a jet of intense heat. It is an instrument of great use with jewellers for soldering small pieces of work, and with glassblowers and enamellers, for softening and working small articles. By these it is often used upon a larger scale with a bellows for supplying it with air, instead of furnishing this by the mouth. But the most important use of the blowpipe is to the mineralogist and analytical chemist, in whose hands it is made to serve the purpose of a small furnace, with the advantage that the operations taking place are directly under the eye. When used, the point is placed in the flame of a lamp, and the current of air is directed across this, by a steady blast from the mouth. A lateral cone of flame is thus produced, which is pale blue without and blue within. At the point of the inner blue cone is the greatest intensity of heat. A small particle of metallic ore placed upon charcoal, and kept at this point, may be reduced to a metallic state, the charcoal aiding the process by its chemical action in abstracting the oxygen of the ore. If of difficult reduction, the experiment may be aided by the introduction of proper fluxes, as in crucible operations. The outer cone of flame in contact with the air possesses oxidating properties; and in this the preparatory operation of calcining and desulphurizing is effected upon the particle of ore, before it is submitted to the reducing flame. Control is thus had over any desired amount of heat, and with a facility of employing it for different purposes in a small way, which renders the blowpipe far preferable for experimental purposes to the cumbersome furnaces and other expensive apparatus which were required before its application for determining the properties of mineral substances. The process of cupellation is very readily effected upon small pieces of metallic lead containing silver or gold. The button of metal is placed in a small cupel of bone ash, and this is laid upon a piece of charcoal for a support. It is thoroughly heated and the button melted in the reducing flame, and then exposed to the action of the oxidizing flame. In this the lead is kept in fusion, and a pellicle of oxide of lead is continually formed upon the surface, and as constantly absorbed in the cupel, till the lead is all thus removed, and the little globule of the more precious metal, so small perhaps as to be scarcely visible, is kept as a bright point in the centre of the cupel. By working upon a weighed quantity in repeated operations, and adding the products to each other, the analysis may be made quantitative by the use of the ingeniously contrived apparatus applied by Plattner to the estimation of the weight of minute bodies. Another important use of the instrument is melting small particles of undetermined substances with different fluxes, as borax or salt of phosphorus, upon a fine piece of platinum wire, hooked at the end to sustain the little bead. By the reaction of the ingredients of the substance with the flux, as seen in the mode of melting, the color of the bead in one flame, and its change to another color in the other flame, these ingredients are detected and the compound determined. For example, copper gives a green bead in the outer flame, but a red one in the inner when borax is the flux used; iron gives a yellowish green bead, cobalt a blue bead, and manganese a violet bead, which is made colorless in the inner flame. The qualitative analysis is rendered more complete by subjecting the substance to the action of the blowpipe in glass tubes, for the purpose of detecting the volatile ingredients, as water by the steam, ammonia by its vapor and odor, sulphur by its odor and yellow sublimate, and arsenic by the metallic ring it forms around the inside of the tube, where its vapor condenses. This may be satisfactorily effected where the particle under examination is too small to be visible without the aid of the microscope. The substance may also be dissolved in acids in glass tubes, and the precipitates obtained, freed from some of their associated matters, be subjected to the test by the blowpipe. Many minerals may be determined by simply heating them alone in platinum-pointed forceps and observing whether they fuse and how; what color they impart to flame, and what appearance the fused mineral presents. Thus the blowpipe, with a few simple

instruments and some tests, all of which may be easily transported, serves the purpose of a portable laboratory. In skilful hands all mineral substances may be determined and a complete qualitative analysis made by it; and by the improvements introduced by Prof. Plattner, many quantitative analyses may be effected for practical purposes.—The blowpipe was first applied to the examination of minerals by Swab, counsellor of the college of mines in Sweden in 1738. Cronstedt, of the same country, next took up the subject, and made great use of the blowpipe for distinguishing minerals by their chemical properties. This was for his work on mineralogy, in which he introduced the classification of minerals according to their chemical composition. This book was first published in 1758, and was translated into English by Von Engeström in 1765, who added to it a treatise upon the blowpipe, and the manner in which it was used by Cronstedt. The attention of scientific men was thus directed to its great use as an analytical instrument, but the difficulty of learning to apply it, without practical instruction, prevented its being so generally received as it deserves to be; and had not the Swedish chemists continued to employ and improve it, it might after all have fallen into disuse. Bergman found it very serviceable in his chemical researches, and Gahn, who assisted him, carried its use to a higher state of perfection than had before been attained. Berzelius enjoyed the most friendly intercourse with this remarkable man, and preserved in his "Elements of Chemistry" the most important results of the experiments, which Gahn never took upon himself to publish. Speaking of Gahn in a later work ("Treatise upon the Use of the Blowpipe"), he remarks that when travelling he always carried this instrument, and all new substances which he met with he subjected to its test; and it was an interesting thing to see the readiness and certainty with which he ascertained the nature of substances not recognizable by their external properties. Long before the subject of vegetable substances containing copper was brought to public notice, Berzelius says he has often seen Gahn extract from the ashes of a quarter of a sheet of paper particles of metallic copper visible to the eye. The most perfect form of the instrument now in use is that adopted by Gahn. The long, straight tube which serves as the handle passes into one end of a cylinder three fourths of an inch long, and half an inch in diameter, from the side of which the jet tube projects about 1½ inch to its capillary extremity. The object of the cylinder is to intercept the moisture of the breath, which without such an arrangement passes through the tube, and is projected in drops into the flame. Berzelius added a little jet of platinum, which slips over the end of the brass jet, and which may be taken off and cleaned whenever it becomes obstructed, by burning out the impurities with the blowpipe itself. The aperture of the platinum jet is 0·012 to 0·015 inch in diameter. Several of them, with holes of different diameters, accompany the instrument, and are changed as the flame is desired to be more pointed and intense, or of less intensity and to cover a larger surface. Considerable practice is required to blow continuously without exhausting the lungs. This is done by breathing only through the nostrils, and using the cheeks for propelling the air. By this means a steady current may be kept up for a long time without fatigue. The process is with some persons very difficult of attainment, but is at last caught, one knows not how, and is never afterward lost. Quick's gas blowpipe, and automatic blowpipes worked by a small rubber ball held in the hand, have been introduced to save the fatigue of blowing from the lungs. The treatise on the blowpipe by Berzelius, which long occupied the first rank among the works upon this subject, and was translated in this country by Mr. J. D. Whitney, has been superseded by an exhaustive book by Professors Plattner and Richter of the royal mining academy of Freiberg. Prof. Plattner has incorporated the results of his operations with the blowpipe in a work of great interest, which has been translated into English by Henry B. Cornwall of the Columbia college school of mines. This forms a very valuable manual, containing the descriptions of the various processes for estimating the quantities in which many of the metals are found in their natural and artificial compounds, as also for detecting the qualities of metallic combinations in general. The methods adopted by Prof. Plattner for separating the minute particles, and ascertaining their weights, are of great ingenuity and simplicity, and valuable for the promptitude with which they may be used; but to be successfully practised, they require long and patient use of the instruments.—The little globules of gold and silver extracted from their combinations by the blowpipe are often too small to be weighed, but their quantity is determined by a method introduced by Harkort of measuring their diameter. This is done by running the globules along between two lines upon an ivory scale, which diverge at a very small angle, and are crossed by many other lines at equal distances from each other, which serve as the divisions of the scale. Wherever the globule is found to be contained between the two diverging lines, its diameter is at once obtained, and the weight corresponding to this, whether of gold or of silver, these having been previously determined with care for the scale. To insure exactness in the measurement, a good magnifying glass is required, and care to view the scale in a position perpendicular to the line of sight. The measuring instrument of Rüger, furnished with a micrometer screw, yields exceedingly accurate results, and saves the fatigue of the eye. Although the globules are not often perfectly spherical, it has been found in practice that within certain limits this method may be relied on for the approximate

analysis of many metallic compounds.—The compound or oxyhydrogen blowpipe is an apparatus invented by Dr. Robert Hare of Philadelphia, in the early part of the present century. By this a mixture of oxygen and hydrogen is made to produce the jet, which being inflamed just beyond their point of mixing, an amount of intense heat is evolved far exceeding what had ever been before obtained. Substances hitherto regarded as infusible were melted down with great facility. Pure lime was observed to give an intensity of light greater than had ever before been seen. This caused its use to be recommended by Lieut. Drummond of the British navy for lighthouses, and his name has since been applied to the light, which was first obtained and noticed by Dr. Hare. The first arrangement adopted by Dr. Hare was to collect each gas in a separate reservoir, and cause them to be discharged by separate jets at the point of combustion. But finding that a more intense heat is generated by first mixing them under some pressure, he brought them into a single tube, and caused this to terminate in 15 jet pipes of platinum. These were adjusted so as to pass through a vessel, in which ice or snow could be placed to keep the gases from becoming heated, and thus obviate the danger of explosion by a retrocession of the flame into the single pipe. With an apparatus of this kind Dr. Hare succeeded in fusing large quantities of platinum, and at the meeting of the American philosophical society in January, 1839, he exhibited a specimen of the metal, weighing between 22 and 23 oz. troy weight, which was part of a mass of 25 oz. fused in May, 1838, about 2 oz. of the metal having flowed over in consequence of the cavity not being sufficiently capacious to contain it all. He also obtained platinum directly from the crude product of the mines. Dr. Hare observed that the most intense heat was generated when the proportion of the gases was the same as in water, viz., two volumes of hydrogen and one of oxygen, and that by the use of a condensing syringe for forcing the mixture with considerable pressure, the effect was still further increased. With this modification, Prof. Clarke, of the university of Cambridge, England, repeated the experiments made years previously by Dr. Hare. He also enclosed in the pipe leading from a vessel containing the two gases a great number of layers of fine wire gauze. Though his experiments were successful, and were a subject of great scientific interest, the apparatus proved too dangerous for use, the wire gauze not preventing the explosion of the gases. Further improvements have been introduced by filling the safety chamber with alternate layers of wire gauze and of the finest fibres of asbestus. Brass wires are also used, packed closely together in a bundle and pressed into the cylindrical portion of the chamber. The quality of the oxygen is found to have a sensible effect upon the intensity of the heat, that obtained from chlorate of potash being much preferable to that from the oxide of manganese. Few substances are found capable of resisting the high temperatures obtained by this blowpipe. Platinum melts instantly, and gold in contact with borax is entirely volatilized. Quartz crystal melts with a beautiful light, pieces of china ware are fused and form crystals, and flints produce a transparent glass.—An apparatus of great efficiency and simplicity of construction was used in New York city by the Drs. Roberts, dentists, for remelting platinum scraps, and converting them into merchantable plate. They employed two copper gasometers of cylindrical form, one for each gas, that for hydrogen of the capacity of 220 gallons, and that for oxygen of 80 gallons. The pressure of the Croton water, which is about 60 lbs. to the square inch, forced the gases through metallic pipes to the apparatus connected with the burner. In this apparatus each pipe connects with a short brass tube, which is closely packed with wire, and these unite in another brass tube, which is also closely packed in the same way. From this, by a pipe of only about a quarter of an inch diameter, the mixed gases are then conveyed to the burner. This is a small platinum box inserted in a lump of plaster of Paris and asbestus, the apertures in the disk making its extremity being 21 little holes in three rows, such as might be made by the point of a pin. The platinum disk in which these holes are perforated is only about $\frac{1}{2}$ by $\frac{1}{4}$ inch in size. It is found that copper answers the purpose quite as well as platinum. The lump of plaster is constructed like the water tuyere of a forge or furnace, and is kept cool by a current of cold water constantly flowing through it. The supply of the gases is regulated by stopcocks, one for each gas, placed near the point of their coming together. The jet points downward. The platinum scraps are first compressed in an iron mould into cylindrical cakes of the weight of 3 or 4 oz. each. Two or three of these are set upon a thin flat fire brick, and heated in a furnace to a white heat. Being then transferred with the fire brick to a large tin pan like a milk pan, which is well coated within with plaster of Paris, and brought under the jet, this is instantly ignited, and the platinum at once begins to melt. Its surface assumes a brilliant appearance of the purest white, like that of silver, and soon the whole is melted into one mass; but so great is its infusibility, that it chills before it can flow off the flat surface of the fire brick, and it cannot therefore be cast in a mould. For the uses to which platinum is applied this is of no consequence, as the cake of metal is easily hammered into any desired shape, or may be rolled at once into plates, or cut and drawn into wire. With the apparatus of the Drs. Roberts, 53 oz. of platinum were melted into one cake at one operation, lasting only 13 minutes, in April, 1858. This was hammered down without waste, and drawn

out into a plate over 40 inches long and about 3 inches wide. Prof. Henry St. Claire Deville of Paris has considerably modified Dr. Roberts's method of melting platinum, and performs the operation in lime crucibles. Messrs. Johnson and Matheys of London have fused some pounds of platinum and iridium in Deville's furnace.—A compound blowpipe is conveniently made by placing one tube one eighth of an inch in diameter inside another of one half inch diameter. Illuminating gas is admitted at the side of the outer tube and lighted at one end, while the other end is made gas-tight. A current of air is blown by bellows through the inner tube, which at once changes the yellow gas flame to the intense blue blowpipe flame; the combustion is more complete and the flame hotter as the mixture of gas and air is more perfect. This piece of apparatus is called Bunsen's blast lamp; it is used in all chemical laboratories which have gas, and is also used by glass blowers in the manufacture of nice chemical and philosophical apparatus. By this method the effect of a furnace is obtained by chemists for melting the contents of small crucibles in analytical operations. If either or both gases be passed through heated pipes, a still higher degree of heat may be obtained. By substituting oxygen for the atmospheric air, globules of platinum may be instantly melted upon charcoal. This mixture may be conveniently and economically used instead of hydrogen and oxygen for the production of the Drummond light. The so-called Bohemian glass blowers seem still to prefer the old-fashioned blowpipe, consisting of two gas burners about 10 inches apart, with air jets blowing directly toward each other, by which means the two opposite sides of the glass are heated at the same time.

BLÜCHER, Gebhard Leberecht von, prince of Wahlstadt, Prussian field marshal, born at Rostock, in Mecklenburg-Schwerin, Dec. 16, 1742, died at Krieblowitz, in Silesia, Sept. 12, 1819. He was sent, while a boy, to the island of Rügen, and there, in 1756, secretly enlisted in a regiment of Swedish hussars as ensign, to serve against Frederick II. of Prussia. Made prisoner in the campaign of 1760, he was, after a year's captivity, and after he had obtained his dismissal from the Swedish service, prevailed upon to enter the Prussian army. In 1771 he was appointed senior captain of cavalry. In 1778 Capt. Von Jägersfeld, a natural son of the margrave of Schwedt, being appointed in his stead to the vacant post of major, Blücher wrote to Frederick: "Sire, Jägersfeld, who possesses no merit but that of being the son of the margrave of Schwedt, has been preferred to me. I beg your majesty to grant my discharge." In reply Frederick ordered him to be shut up in prison until he would retract his request; but as he remained obstinate for nearly a year, the king complied with his petition in a note to this effect: "Capt. Von Blücher may go to the devil." He now retired to Silesia, married, became a farmer, acquired a small estate in Pomerania, and, after the death of Frederick II., reëntered his former regiment as major, on the express condition of his appointment being dated back to 1779. Some months later his wife died. Having participated in the bloodless invasion of Holland, he was appointed lieutenant colonel in 1788, and in 1790 colonel. In 1793 he distinguished himself during the campaign in the Palatinate against republican France as a leader of light cavalry, and in May, 1794, after the victorious affair of Kirrweiler, was promoted to the rank of major general. While incessantly alarming the French by bold *coups de main* and successful enterprises, he never neglected keeping the headquarters supplied with the best information as to the hostile movements. His diary, written during this campaign, and published in 1796 by Count Goltz, his adjutant, is considered, despite its illiterate style, a classical work on vanguard service. After the peace of Basel he married again. Frederick William III. appointed him in 1801 lieutenant general, in which quality he occupied, and administered as governor, Erfurt, Mühlhausen, and Münster. In 1805 a small corps of observation was collected under him at Bayreuth. In 1806 he led the Prussian vanguard at the battle of Auerstädt (Oct. 14). His charge was, however, broken by the terrible fire of Davoust's artillery, and his proposal to renew it with fresh forces and the whole of the cavalry was rejected by the king of Prussia. After the double defeat at Auerstädt and Jena, he retired down the Elbe, picking up the remnants of different corps, which swelled his army to about 25,000 men. His retreat to Lübeck, before the united forces of Soult, Bernadotte, and Murat, forms one of the few honorable episodes in that epoch of German warfare. Since Lübeck was a neutral territory, his making the streets of that open town the theatre of a desperate fight, which exposed it to a three days' sack on the part of the French soldiery, afforded the subject of passionate censure; but under existing circumstances the important thing was to give the German people one example, at least, of stanch resistance. Thrown out of Lübeck, he had to capitulate in the plain of Ratkow, Nov. 7, on the express condition that the cause of his surrender should be stated in writing to be "want of ammunition and provisions." Liberated on his word of honor, he repaired to Hamburg, there, in company with his sons, to kill time by card-playing, smoking, and drinking. Being exchanged for Gen. Victor, he was appointed governor general of Pomerania; but one of the secret articles of the alliance concluded, Feb. 24, 1812, by Prussia with Napoleon, stipulated for Blücher's discharge from service, like that of Scharnhorst and other distinguished Prussian patriots. To soothe this official disgrace, the king secretly bestowed upon him the handsome estate of Kunzendorf in Silesia. During the period of transition between the peace of Tilsit and the German war

of independence, Scharnhorst and Gneisenau, the chiefs of the Tugenbund, desiring to extemporize a popular hero, had chosen Blücher. In propagating his fame among the masses, they had succeeded so well, that when Frederick William III. called the Prussians to arms by the proclamation of March 17, 1813, they were strong enough to impose him upon the king as the general-in-chief of the Prussian army. In the well contested, but for the allies unfortunate, battles of Lützen and Bautzen he acted under Wittgenstein, the commander of the Russian army. During the retreat of the allied armies from Bautzen to Schweidnitz, he lay in ambush at Haynau, from which he fell with his cavalry on the French advanced guard under Maison, who in this affair lost 1,500 men and 11 guns. Through this surprise Blücher raised the spirit of the Prussian army, and made Napoleon very cautious in pursuit.—Blücher's command of an independent army dates from the expiration of the truce of Trachenberg, Aug. 10, 1813. The allied sovereigns had then divided their forces into three armies: the army of the north under Bernadotte, stationed along the lower Elbe; the main army, advancing through Bohemia; and the Silesian army, with Blücher as its commander-in-chief, supported by Gneisenau as the chief of his staff, and Müffling as his quartermaster general. These two men, attached to him in the same quality until the peace of 1815, supplied all his strategical plans. Blücher himself, as Müffling says, "understood nothing of the strategical conduct of a war; so little indeed, that when a plan was laid before him for approval, even relating to some unimportant operation, he could not form any clear idea of it, or judge whether it was good or bad." Like many of Napoleon's marshals, he was unable to read the maps. The Silesian army was composed of three *corps d'armée:* 40,000 Russians, under Count Langeron; 16,000 men under Baron von Sacken; and a Prussian corps of 40,000 men under Gen. York. Blücher's position was extremely difficult at the head of this heterogeneous army. Langeron, who had already held independent commands, and demurred to serving under a foreign general, was moreover aware that Blücher had received secret orders to limit himself to the defensive, but was altogether ignorant that the latter, in an interview on Aug. 11 with Barclay de Tolly at Reichenbach, had extorted the permission to act according to circumstances. Hence Langeron thought himself justified in disobeying orders whenever the general-in-chief seemed to him to swerve from the preconcerted plan, and in this mutinous conduct he was strongly supported by Gen. York. The danger arising from this state of things became more and more threatening, when the battle on the Katzbach secured Blücher that hold on his army which guided it to the gates of Paris. Marshal Macdonald, charged by Napoleon to drive the Silesian army back into the interior of Silesia, began the battle by attacking, Aug. 26, Blücher's outposts, stationed from Prausnitz to Kraitsch, where the Neisse flows into the Katzbach. The so-called battle on the Katzbach consisted in fact of four different actions, the first of which, the dislodging by a bayonet attack from a plateau behind a ridge on the right bank of the Neisse of about eight French battalions, which constituted hardly one tenth of the hostile force, led to results quite out of proportion to its original importance, in consequence of the fugitives from the plateau not being collected at Niederkrain, and left behind the Katzbach at Kraitsch, in which case their flight would have had no influence whatever on the rest of the French army; in consequence of different defeats inflicted at nightfall upon the enemy by Sacken's and Langeron's corps stationed on the left bank of the Neisse; in consequence of Marshal Macdonald, who commanded in person on the left bank, and had defended himself weakly till 7 o'clock in the evening against Langeron's attack, marching his troops at once after sunset to Goldberg, in such a state of exhaustion that they could no longer fight, and must fall into the enemy's hand; and, lastly, in consequence of the state of the season, violent rains swelling the otherwise insignificant streams the fugitive French had to traverse—the Neisse, the Katzbach, the Deichsel, and the Bober—to rapid torrents, and making the roads almost impracticable. Thus it occurred, that with the aid of the country militia in the mountains on the left flank of the Silesian army, the battle on the Katzbach, insignificant in itself, resulted in the capture of 18,000 prisoners, above 100 pieces of artillery, and more than 300 ammunition, hospital, and baggage wagons. After the battle Blücher did everything to instigate his forces to exert their utmost strength in the pursuit of the enemy, justly representing to them that "with some bodily exertion they might spare a new battle." On Sept. 3 he crossed the Neisse with his army, proceeding by Görlitz to concentrate at Bautzen. By this move he saved the main army, which, routed at Dresden, Aug. 27, and forced to retreat behind the Erzgebirge, was now disengaged; Napoleon being compelled to advance with reenforcements toward Bautzen, there to take up the army defeated on the Katzbach, and to offer battle to the Silesian army. During his stay in the E. corner of Saxony, Blücher, by a series of retreats and advances, always shunned battle when offered by Napoleon, but always engaged when encountering single detachments of the French army. On Sept. 22, 23, and 24 he executed a flank march on the right of the enemy, advancing by forced marches to the lower Elbe, in the vicinity of the army of the north. On Oct. 2 he bridged the Elbe at Elster with pontoons, and on the morning of the 3d his army defiled. This movement, not only bold, but even hazardous, inasmuch as he completely abandoned his lines of communication, was

necessitated by supreme political reasons, and led finally to the battle of Leipsic, which but for Blücher the slow and over-cautious grand army would never have risked. The army of the north, of which Bernadotte was the commander-in-chief, was about 90,000 strong, and it was of the utmost importance that it should advance on Saxony. By means of the close connection which he maintained with Bülow and Wintzingerode, the commanders of the Prussian and Russian corps forming part of the army of the north, Blücher believed that he had obtained convincing proofs of Bernadotte's coquetting with the French, and of the impossibility of inciting him to any activity so long as he remained alone on a separate theatre of war. Bülow and Wintzingerode declared themselves ready to act in spite of Bernadotte, but to do so they wanted the support of 100,000 men. Hence Blücher's resolution to venture upon his flank march, in which he persisted despite the orders he had received from the sovereigns to draw near to them on the left, toward Bohemia. He was not to be diverted from his purpose through the obstacles which Bernadotte systematically threw in his way, even after the crossing of the Elbe by the Silesian army. Before leaving Bautzen he had despatched a confidential officer to Bernadotte, to inform him that, since the army of the north was too weak to operate alone on the left bank of the Elbe, he would come with the Silesian army, and cross at Elster on Oct. 3; he therefore invited him to cross the Elbe at the same time, and to advance with him toward Leipsic. Bernadotte not heeding this message, and the enemy occupying Wartenburg opposite Elster, Blücher first dislodged the latter, and then, to protect himself in case Napoleon should fall upon him with his whole strength, began establishing an intrenched encampment from Wartenburg to Bleddin. Thence he pushed forward toward the Mulde. On Oct. 7, in an interview with Bernadotte, it was arranged that both armies should march upon Leipsic. On the 9th, while the Silesian army was preparing for this march, Bernadotte, on the news of Napoleon's advance on the road from Meissen, insisted upon retreating behind the Elbe, and only consented to remain on its left bank on condition that Blücher would resolve to cross the Saale in concert with him, in order to take up a position behind that river. Although by this movement the Silesian army lost anew its line of communication, Blücher consented, since otherwise the army of the north would have been effectually lost for the allies. On Oct. 10 the whole Silesian army stood united with the army of the north on the left bank of the Mulde, the bridges over which were destroyed. Bernadotte now declared a retreat upon Bernburg to have become necessary, and Blücher, with the single view of preventing him from crossing the right bank of the Elbe, yielded again on the condition that Bernadotte should cross the Saale at Wettin and take up a position there. On the 11th, when his columns were just crossing the high road from Magdeburg to Halle, Blücher being informed that, in spite of his positive promise, Bernadotte had constructed no bridge at Wettin, resolved upon following that high road in forced marches. Napoleon, seeing that the northern and Silesian armies avoided accepting battle, which he had offered them by concentrating at Düben, and knowing that they could not avoid it without retreating across the Elbe —being at the same time aware that he had but four days left before he must meet the main army, and thus be placed between two fires— undertook a march on the right bank of the Elbe toward Wittenberg, in order by this simulated movement to draw the northern and Silesian armies across the Elbe, and then strike a rapid blow on the main army. Bernadotte indeed, anxious for his lines of communication with Sweden, gave his army orders to cross without delay to the right bank of the Elbe, by a bridge constructed at Aken, while on the same day, Oct. 13, he informed Blücher that the emperor Alexander had, for certain important reasons, put him (Blücher) under his orders. He consequently requested him to follow his movements on the right bank of the Elbe with the Silesian army, with the least possible delay. Had Blücher shown less resolution on this occasion and followed the army of the north, the campaign would have been lost, since the Silesian and northern armies, amounting together to nearly 200,000 men, would not have been present at the battle of Leipsic. He wrote in reply to Bernadotte that, according to all his information, Napoleon had no intention whatever of removing the theatre of war to the right bank of the Elbe, but only intended to lead them astray. At the same time he conjured Bernadotte to give up his intended movement across the Elbe. Having, meanwhile, again and again solicited the main army to push forward upon Leipsic, and offered to meet it there, he received at last, Oct. 15, the long expected invitation. He immediately advanced toward Leipsic, while Bernadotte retreated toward the Petersberg. On his march from Halle to Leipsic, Oct. 16, Blücher routed at Möckern the 6th corps of the French army under Marmont, in a hotly contested battle, in which he captured 54 pieces of artillery. Without delay he sent accounts of the issue of this battle to Bernadotte, who was not present on the first day of the battle of Leipsic. On its second day, Oct. 17, Blücher dislodged the enemy from the right bank of the Parthe, with the exception of some houses and intrenchments near the Halle gate. On the 18th, at daybreak, he had a conference at Brachenfeld with Bernadotte, who declared he could not attack on the left bank of the Parthe unless Blücher gave him for that day 30,000 men of the Silesian army. Keeping the interest of the whole exclusively in view, Blücher consented without hesitation, but on the condition of remaining himself with these

30,000 men, and thus securing their vigorous coöperation in the attack. After the final victory of Oct. 19, and during the whole of Napoleon's retreat from Leipsic to the Rhine, Blücher alone gave him an earnest pursuit. While, on Oct. 19, the generals in command met the sovereigns in the market place of Leipsic, and precious time was spent in mutual compliments, his Silesian army was already marching in pursuit of the enemy to Lützen. On his march from Lützen to Weissenfels, Prince William of Prussia overtook him, to deliver to him the commission of a Prussian field marshal. The allied sovereigns had allowed Napoleon to gain a start which could never be recovered; but from Eisenach onward Blücher found himself every afternoon in the room which Napoleon had left in the morning. When about to march upon Cologne, there to cross the Rhine, he was recalled and ordered to blockade Mentz on its left bank; his rapid pursuit as far as the Rhine having broken up the confederation of the Rhine, and disengaged its troops from the French divisions in which they were still enrolled. While the headquarters of the Silesian army was established at Höchst, the main army marched up the upper Rhine. Thus ended the campaign of 1813, the success of which was entirely due to Blücher's bold enterprise and iron energy.—The allies were divided as to the plan of operations now to be followed; the one party proposing to stay on the Rhine, and there to take up a defensive position; the other to cross the Rhine and march upon Paris. After much wavering on the part of the sovereigns, Blücher and his friends prevailed, and the resolution was adopted to advance upon Paris in a concentric movement, the main army being to start from Switzerland, Bülow from Holland, and Blücher, with the Silesian army, from the middle Rhine. For the new campaign, three additional corps were made over to Blücher, viz., Kleist's, the elector of Hesse's, and the duke of Saxe-Coburg's. Leaving part of Langeron's corps to invest Mentz, and the new reënforcements to follow as a second division, Blücher crossed the Rhine Jan. 1, 1814, at three points, at Mannheim, Caub, and Coblentz, drove Marmont beyond the Vosges and the Saar, posted York's corps between the fortresses of the Moselle, and with a force of 28,000 men, consisting of Sacken's corps and a division of Langeron's, proceeded by Vaucouleurs and Joinville to Brienne, in order to effect his junction with the main army by his left. At Brienne, Jan. 29, he was attacked by Napoleon, whose forces mustered about 40,000, while York's corps was still detached from the Silesian army, and the main army, 110,000 strong, had only reached Chaumont. Blücher had consequently to face the greatly superior forces of Napoleon, but the latter neither attacked him with his usual vigor, nor hindered his retreat to Trannes, save by some cavalry skirmishes. Having taken possession of Brienne, placed part of his troops in its vicinity, and occupied Dienville, La Rothière, and Chaumenil, with three different corps, Napoleon would on Jan. 30 have been able to fall upon Blücher with superior numbers, as the latter was still awaiting his reenforcements. Napoleon, however, kept up a passive attitude, while the main army was concentrating by Bar-sur-Aube, and detachments of it were strengthening Blücher's right flank. The emperor's inactivity is explained by the negotiations of the peace congress of Châtillon, which he had contrived to start, and by which he expected to gain time. In fact, after the junction of the Silesian with the main army had been effected, the diplomatic party insisted that during the deliberations of this congress the war should be carried on as a feint only. Prince Schwarzenberg sent an officer to Blücher to procure his acquiescence, but Blücher dismissed him with this answer: "We must go to Paris. Napoleon has paid his visits to all the capitals of Europe; should we be less polite? In short, he must descend from the throne, and until he is hurled from it we shall have no rest." He urged the great advantages of the allies attacking Napoleon near Brienne, before he could bring up the remainder of his troops, and offered to make the attack himself, if he were only strengthened in York's absence. The consideration that the army could not subsist in the barren valley of the Aube, and must retreat if it did not attack, caused his advice to prevail. The battle was decided upon, but Prince Schwarzenberg, commander-in-chief of the main army, instead of bearing upon the enemy with the united force at hand, only lent Blücher the corps of the crown prince of Würtemberg (40,000 men), that of Gyulay (12,000), and that of Wrede (12,000). Napoleon on his part neither knew nor suspected anything of the arrival of the main army. When about 1 o'clock, Feb. 1, it was announced to him that Blücher was advancing, he would not believe it. Having made sure of the fact, he mounted his horse with the idea of avoiding the battle, and gave Berthier orders to this effect. When, however, between Old Brienne and Rothière, he reached the young guard, who had got under arms on hearing the approaching cannonade, he was received with such enthusiasm that he thought fit to improve the opportunity, and exclaimed, "*L'artillerie en avant!*" Thus, about 4 o'clock, the affair of La Rothière commenced in earnest. At the first reverse, however, Napoleon no longer took any personal part in the battle. His infantry having thrown itself into the village of La Rothière, the combat was long and obstinate, and Blücher was even obliged to bring up his reserve. The French were not dislodged from the village till 11 o'clock at night, when Napoleon ordered the retreat of his army, which had lost 4,000 or 5,000 men in killed and wounded, 2,500 prisoners, and about 50 cannon. If the allies, then only six days' march from Paris, had vigorously pushed on, Napoleon must have succumbed before their immensely superior numbers; but the

sovereigns, still apprehensive of cutting Napoleon off from making his peace at the congress of Châtillon, allowed Prince Schwarzenberg to seize upon every pretext for shunning a decisive action. While Napoleon ordered Marmont to return on the right bank of the Aube toward Ramerupt, and himself retired by a flank march upon Troyes, the allied army split into two armies, the main army advancing slowly upon Troyes, and the Silesian army marching to the Marne, where Blücher knew he would find York, besides part of Langeron's and Kleist's corps, so that his aggregate forces would be swelled to about 50,000 men. The plan was for him to pursue Marshal Macdonald, who had meanwhile appeared on the lower Marne, to Paris, while Schwarzenberg was to keep in check the French main army on the Seine. Napoleon, however, seeing that the allies did not know how to use their victory, and sure of returning to the Seine before the main army could have advanced far in the direction of Paris, resolved to fall upon the weaker Silesian army. Consequently, he left 20,000 men under Victor and Oudinot in face of the 100,000 men of the main army, advanced with 40,000 men, the corps of Mortier and Ney, in the direction of the Marne, took up Marmont's corps at Nogent, and on Feb. 9 arrived with these united forces at Sézanne. Meanwhile Blücher had proceeded by St. Ouen and Sompuis on the road leading to Paris, and on Feb. 9 established his headquarters at the little town of Vertus. The disposition of his forces was this: about 10,000 men at his headquarters; 18,000, under York, posted between Dormans and Château-Thierry, in pursuit of Macdonald, who was already on the great post road leading to Paris from Épernay; 30,000 under Sacken, between Montmirail and La Ferté-sous-Jouarre, destined to prevent the intended junction of Sebastiani's cavalry with Macdonald, and to cut off the passage of the latter at La Ferté-sous-Jouarre; the Russian general Olzuvieff cantoned with 5,000 men at Champaubert. This faulty distribution, by which the Silesian army was drawn up in a very extended position *en échelon*, resulted from the contradictory motives which actuated Blücher, or rather his military advisers, Gneisenau and Müffling. On the one hand, he desired to cut off Macdonald, and prevent his junction with Sebastiani's cavalry; on the other hand, to take up the corps of Kleist and Kaptzevitch, who were advancing from Châlons, and expected to unite with him on the 9th and 10th. The one motive kept him back, the other pushed him on. On Feb. 9 Napoleon fell upon Olzuvieff at Champaubert, and routed him. Blücher, with Kleist and Kaptzevitch, who had meanwhile arrived, but without the greater part of their cavalry, advanced against Marmont, despatched by Napoleon, and followed him in his retreat upon La Fère Champenoise, but, on the news of Olzuvieff's discomfiture, returned in the same night with his two corps to Bergères, there to cover the road to Châlons. After a successful combat on the 10th, Sacken had driven Macdonald across the Marne at Trilport, but, hearing on the night of the same day of Napoleon's march to Champaubert, hastened back on the 11th toward Montmirail. Before reaching it, he was at Vieils Maisons obliged to form against the emperor, coming from Montmirail to meet him. Beaten with great loss before York could unite with him, the two generals effected their junction at Viffort, and retreated Feb. 12 to Château-Thierry, where York had to stand a very damaging rear-guard engagement, and withdrew thence to Oulchy-la-Ville. Having ordered Mortier to pursue York and Sacken on the road of Fismes, Napoleon remained on the 13th at Château-Thierry. Uncertain as to the whereabout of York and Sacken and the success of their engagements, Blücher had from Bergères, during the 11th and 12th, quietly watched Marmont posted opposite him at Étoges. When informed on the 13th of the defeat of his generals, and supposing Napoleon to have moved off in search of the main army, he gave way to the temptation of striking a parting blow upon Marmont, whom he considered Napoleon's rear guard. Advancing on Champaubert, he pushed Marmont to Montmirail, where the latter was joined on the 14th by Napoleon, who now turned against Blücher, met him at noon at Vauchamps, 20,000 strong, but almost without cavalry, attacked him, turned his columns with cavalry, and threw him back with great loss on Champaubert. During its retreat from the latter place, the Silesian army might have reached Étoges before it grew dark, without any considerable loss, if Blücher had not taken pleasure in the deliberate slowness of the retrograde movement. Thus he was attacked during the whole of his march, and one detachment of his forces, the division of Prince Augustus of Prussia, was again beset from the side streets of Étoges, on its passage through that town. About midnight Blücher reached his camp at Bergères, broke up after some hours' rest for Châlons, and arrived there about noon, Feb. 15. At this place he was joined by York's and Sacken's forces on the 16th and 17th. The different affairs at Champaubert, Montmirail, Château-Thierry, Vauchamps, and Étoges had cost him 15,000 men and 27 guns. Leaving Marmont and Mortier to front Blücher, Napoleon with Ney returned in forced marches to the Seine, where Schwarzenberg had driven back Victor and Oudinot, who had retreated across the Yères, and there taken up 12,000 men under Macdonald, and some reënforcements from Spain. On the 16th they were surprised by the sudden arrival of Napoleon, followed on the 17th by his troops. After his junction with the marshals he hastened against Schwarzenberg, whom he found posted in an extended triangle, having for its summits Nogent, Montereau, and Sens. The generals under his command, Wittgenstein, Wrede, and the crown

prince of Würtemberg, being successively attacked and routed by Napoleon, Prince Schwarzenberg retreated toward Troyes and sent word to Blücher to join him, so that they might in concert give battle on the Seine. Blücher, strengthened by new reënforcements, immediately followed this call, entered Méry Feb. 21, and waited there the whole of the 22d for the dispositions of the promised battle. He learned in the evening that an application for a truce had been made to Napoleon, through Prince Liechtenstein, who had met with a flat refusal. Instantly despatching a confidential officer to Troyes, he conjured Prince Schwarzenberg to give battle, and even offered to give it alone if the main army would only form a reserve; but Schwarzenberg, still more frightened by the news that Augereau had driven Gen. Bubna back into Switzerland, had already ordered the retreat upon Langres. Blücher understood at once that a retreat upon Langres would lead to a retreat beyond the Rhine; and, in order to draw Napoleon off from the pursuit of the dispirited main army, resolved upon again marching straight in the direction of Paris, toward the Marne, where he could now expect to assemble an army of 100,000 men, Wintzingerode having arrived with about 25,000 men in the vicinity of Rheims, Bülow at Laon with 16,000 men, the remainder of Kleist's corps being expected from Erfurt, and the rest of Langeron's corps, under St. Priest, from Mentz. It was this second separation of Blücher from the main army that turned the scale against Napoleon. If the latter had followed the retreating main army instead of the advancing Silesian one, the campaign would have been lost for the allies. The passage of the Aube before Napoleon had followed him, the only difficult point in Blücher's advance, he effected by constructing a pontoon bridge at Anglure on Feb. 24. Napoleon, commanding Oudinot and Macdonald, with about 25,000 men, to follow the main army, left Herbisse on the 26th, together with Ney and Victor, in pursuit of the Silesian army. On the advice sent by Blücher that the main army had now but the two marshals before it, Schwarzenberg stopped his retreat, turned round upon Oudinot and Macdonald, and beat them on the 27th and 28th. It was Blücher's intention to concentrate his army at some point as near as possible to Paris. Marmont with his troops was still posted at Sézanne, while Mortier was at Château-Thierry. On Blücher's advance, Marmont retreated, and united on the 26th with Mortier at La Ferté-sous-Jouarre, thence to retire with the latter upon Meaux. Blücher's attempt during two days to cross the Ourcq, and with a strongly advanced front to force the two marshals to battle, having failed, he was now obliged to march on the right bank of that river. He reached Oulchy-le-Château on March 2, learned in the morning of the 3d the capitulation of Soissons, which had been effected by Bülow and Wintzingerode, and in the course of the same day crossed the Aisne and concentrated his whole army at Soissons. Napoleon, who had crossed the Marne at La Ferté-sous-Jouarre, two forced marches behind Blücher, advanced in the direction of Château-Thierry and Fismes, and, having passed the Vesle, crossed the Aisne at Berry-au-Bac, March 6, after the recapture of Rheims by a detachment of his army. Blücher originally intended to offer battle behind the Aisne on Napoleon's passage of that river, and had drawn up his troops for that purpose. When he became aware that Napoleon took the direction of Fismes and Berry-au-Bac, in order to pass the Silesian army by the left, he decided upon attacking him from Craonne on the flank, in an oblique position, immediately after his debouching from Berry-au-Bac, so that Napoleon would have been forced to give battle with a defile in his rear. Having already posted his forces, with the right wing on the Aisne, with the left on the Lette, half way from Soissons to Craonne, he resigned this excellent plan on making sure that Napoleon had on the 6th been allowed by Wintzingerode to pass Berry-au-Bac unmolested, and had even pushed a detachment on the road to Laon. He now thought it necessary to accept no decisive battle except at Laon. To delay Napoleon, who by Corbeny, on the causeway from Rheims, could reach Laon as soon as the Silesian army from Craonne, Blücher posted the corps of Vorontzoff between the Aisne and the Lette, on the strong plateau of Craonne, while he despatched 10,000 horse under Wintzingerode, to push on by Fétieux toward Corbeny, with the order to fall upon the right flank and rear of Napoleon as soon as the latter should be engaged in attacking Vorontzoff. Wintzingerode failing to execute the manœuvre intrusted to him, Napoleon drove Vorontzoff from the plateau on the 7th, but himself lost 8,000 men, while Vorontzoff escaped with the loss of 4,700, and proved able to effect his retreat in good order. On the 8th Blücher had concentrated his troops at Laon, where the battle must decide the fate of both armies. Apart from his numerical superiority, the vast plain before Laon was peculiarly adapted for deploying the 20,000 horse of the Silesian army, while Laon itself, situated on the plateau of a detached hill, which has on every side a fall of 12 to 30 degrees, and at the foot of which lie four villages, offered great advantages for the defence as well as the attack. On that day the left French wing, led by Napoleon himself, was repulsed, while the right wing, under Marmont, surprised in its bivouacs at nightfall, was so completely worsted that the marshal could not bring his troops to a halt before reaching Fismes. Napoleon, completely isolated with his wing, numbering 35,000 men only, and cooped up in a bad position, must have yielded before far superior numbers flushed with victory. But on the following morning a fever attack and an inflammation of the

eyes disabled Blücher, while Napoleon yet remained in a provocatory attitude, in the same position, which so far intimidated the men who now directed the operations that they not only stopped the advance of their own troops which had already begun, but allowed Napoleon to quietly retire at nightfall to Soissons. Still the battle of Laon had broken his forces, physically and morally. He tried in vain by the sudden capture on March 13 of Rheims, which had fallen into the hands of St. Priest, to restore himself. So fully was his situation now understood, that when he advanced on the 17th and 18th on Arcis-sur-Aube, against the main army, Schwarzenberg himself dared to stand and accept battle, which lasted through the 20th and 21st. When Napoleon broke it off, the main army followed him up to Vitry, and united in his rear with the Silesian army. In his despair Napoleon took a last refuge in a retreat upon St. Dizier, pretending thus to endanger with his handful of men the enormous army of the allies, by cutting off its main line of communication and retreat between Langres and Chaumont; a movement replied to on the part of the allies by their onward march to Paris. On March 30 took place the battle before Paris, in which the Silesian army stormed Montmartre. Though Blücher had not recovered since the battle of Laon, he still appeared in the battle for a short time, on horseback, with a shade over his eyes; but after the capitulation of Paris he laid down his command, the pretext being his sickness, and the real cause the clashing of his open-mouthed hatred against the French with the diplomatic attitude which the allied sovereigns thought fit to exhibit. Thus he entered Paris, March 31, in the capacity of a private individual. During the whole campaign of 1814, he alone among the allied army represented the principle of the offensive. By the battle of La Rothière he baffled the Châtillon pacificators; by his resolution at Méry he saved the allies from a ruinous retreat; and by the battle of Laon he decided the first capitulation of Paris.—After the first peace of Paris he accompanied the emperor Alexander and King Frederick William of Prussia on their visit to England, where he was fêted as the hero of the day. All the military orders of Europe were showered upon him; the king of Prussia created for him the order of the iron cross; the prince regent of England gave him his portrait, and the university of Oxford the academical degree of LL. D. In 1815 he again decided the final campaign against Napoleon. After the disastrous battle of Ligny, June 16, though now 73 years of age, he prevailed upon his routed army to form anew and march on the heels of their victor, so as to be able to appear in the evening of June 18 on the battlefield of Waterloo, an exploit unprecedented in the history of war. (See WATERLOO.) His pursuit of the French fugitives from Waterloo to Paris possesses one parallel only, in Napoleon's equally remarkable pursuit of the Prussians from Jena to Stettin. He now entered Paris at the head of his army, and even had Müffling, his quartermaster general, installed as the military governor general of Paris. He insisted upon Napoleon's being shot, the bridge of Jena blown up, and the restitution to their original owners of the treasures plundered by the French in the different capitals of Europe. The first wish was baffled by Wellington, and the second by the allied sovereigns, while the last was realized. He remained at Paris three months, very frequently attending the gambling tables for *rouge-et-noir*. On the anniversary of the battle on the Katzbach he paid a visit to Rostock, his native place, where the inhabitants united to raise a public monument in his honor. On the occurrence of his death, the whole Prussian army went into mourning for eight days.—*Le vieux diable*, as he was nicknamed by Napoleon, "Marshal Forwards," as he was styled by the Russians of the Silesian army, was essentially a general of cavalry. In this specialty he excelled, because it required tactical acquirements only, but no strategical knowledge. Participating to the highest degree in the popular hatred against Napoleon and the French, he was popular with the multitude for his plebeian passions, his gross common sense, the vulgarity of his manners, and the coarseness of his speech, to which, however, he knew on fit occasions how to impart a touch of fiery eloquence. He was the model of a soldier. Setting an example as the bravest in battle and the most indefatigable in exertion; exercising a fascinating influence on the common soldier; joining to his rash bravery a sagacious appreciation of the ground, a quick resolution in difficult situations, stubbornness in defence equal to his energy in the attack, with sufficient intelligence to find for himself the right course in simpler combinations, and to rely upon Gneisenau in those which were more intricate, he was the true general for the military operations of 1813–'15, which bore the character half of regular and half of insurrectionary warfare. The biography of Blücher has been written by Varnhagen von Ense (Berlin, 1843), Bieske (1862), and Scherr (2 vols., Leipsic, 1862).

BLUDOFF, Dmitri Nikolayevitch, count, a Russian statesman, born in Moscow in 1783, died in St. Petersburg, March 2, 1864. He studied at the university of Moscow, was long in the diplomatic service in London, Stockholm, and Vienna, and was afterward transferred to the domestic administration. At the advent of Nicholas he belonged, with Dashkoff and Uvaroff, to the triad which Karamzin, the Russian historian, recommended, at the request of the new emperor, as the fittest men to carry out his reformatory ideas. Bludoff was appointed secretary of state, and in 1832 was transferred to the more important position of secretary of the interior. In 1839 he succeeded Dashkoff as secretary of the department of justice, and subsequently became president

of the legislative department in the council of the empire. As such he put the last hand to the compilation and publication of the general code of civil and criminal laws (*Svod Zakonov*). He was made a count of the empire in 1842. In 1846–'7 he was special envoy to Rome, to conclude a concordat. After the accession of Alexander II. in 1855 Bludoff was appointed president of the academy of sciences at St. Petersburg, and three years later was named on the committee to prepare measures for the emancipation of the serfs. In 1861, on the resignation of Prince Orloff, he became president of the council of ministers and of the council of the empire.

BLUE, one of the seven primary colors. Like the green of the forest and the field, nature appears to have adopted the color for the sea and sky with reference to its soft and pleasing effect upon the eye. In these, its various shades are seen in their highest perfection, and they are also most brilliantly displayed in the sapphire and the turquoise. In the arts, it is derived for dyes from the products of the vegetable, animal, and mineral kingdoms. Indigo is the most common vegetable material for producing it. A great variety of berries are also used, the juices of which become blue by the addition of alkali or salts of copper. Among mineral substances, cobalt is the most remarkable for the brilliant blue produced by its salts. Cobalt blue is used for coloring glass and porcelain. Mountain blue is derived from carbonate of copper. Bremen blue or verditer is a greenish blue color, obtained from copper mixed with carbonate of lime. Prussian blue, used for chemical purposes and as a pigment, is obtained from horns, hoofs, or dried blood; other blues are obtained from combinations of molybdenum and oxide of tin. Ultramarine is a beautiful blue pigment prepared from the mineral lapis lazuli, which until recently has defied all imitation.

BLUE, Prussian. See Prussian Blue.

BLUEBIRD, a North American bird of the genus *sialia*, order *passeres*, tribe *dentirostres*, and family *luscinidæ*. The best known species, *S. Wilsonii* (Swains.), is about 7 inches long and 10 inches in extent of wings; the bill is black, about half an inch long, and nearly straight; the plumage of the male is soft and blended, above of a bright azure blue, below yellowish brown, and the belly white; the female has the upper parts of a hue approaching leaden, with the rest like the male, though duller; the young have the head and back brownish. It is found in all parts of the United States, excepting perhaps some of the Pacific territories; it is very sprightly and familiar, and is always a welcome visitor. The nest is made either in a box prepared for it, or in any convenient hole in a tree; the eggs are from four to six, of a pale blue color. The food consists of various kinds of insects and spiders, and also the ripe fruits of the south. Its song is a soft agreeable warble, becoming plaintive as winter approaches, at which season most of them repair to the southern states. There are two other species much resembling the above, *S. Mexicana* (Swains.)

Bluebird (Sialia Wilsonii).

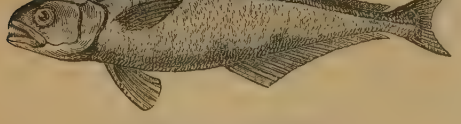
and *S. arctica* (Swains.). The bluebird is one of the earliest of our spring songsters, and does good service to the agriculturist in destroying beetles, grasshoppers, grubs, wire-worms, and other similar pests; it rarely injures garden fruits, preferring those of the sumach and the wild cherry.

BLUE EARTH, a S. county of Minnesota, bounded N. partly by the Minnesota river; area, 760 sq. m.; pop. in 1870, 17,302. The Winona and St. Peter, the Minnesota and Northwestern, and the St. Paul and Sioux City railroads traverse the county. The chief productions in 1870 were 725,879 bushels of wheat, 198,060 of Indian corn, 467,575 of oats, 35,146 of barley, 65,393 of potatoes, 18,994 tons of hay, and 87,971 lbs. of butter. There were 4,402 horses, 11,731 horned cattle, 6,690 sheep, and 5,652 swine. Capital, Mankato.

BLUEFIELDS, or **Blewfields,** a river and town of Nicaragua, the latter on the Mosquito coast. The river is several hundred miles long, is navigable for 80 miles, and empties into an inlet of the Caribbean sea. It is also known as Rio Escondido. The town stands on an eminence at the mouth of the river, about 200 m. E. S. E. of Leon, and 150 m. N. of San José, Costa Rica, and has about 500 inhabitants and a good harbor. It was formerly the residence of the king of the Mosquito country.

BLUEFISH (*temnodon saltator*, Cuv.), an acanthopterygian fish of the family of *scombridæ*, called also the skipjack, and sometimes horse mackerel; both of the latter terms are applied to other scomberoid fishes, and the last especially, on the New England coast, to a species of tunny. All the upper part of the

body is of a bluish color, the lower part of sides and abdomen whitish, a large black spot at the base of pectoral fins; the jaws are armed with prominent, sharp, and lancinated teeth, the lower with one row, the upper with a second posterior row of small ones; the base of the tongue, vomer, and palatal bones are also crowded with very small teeth; the operculum terminates in two points, not spines, the lateral line beginning just above its posterior angle, and, curving with the body, terminating at the base of the caudal fin; the fins are covered with scales. It arrives on the coast of the middle states early in the spring, accompanying the weakfish (*otolithus regalis*, Cuv.) in its migrations, and feeding principally upon it; it is not uncommon in Massachusetts bay in the summer months, where it is often seen chasing the schools of menhaden and mackerel, jumping out of water, and so hotly pursuing its prey as to drive large numbers of them upon the beaches. The size varies from 1 to 3 feet in length, the weight from 5 to 14 lbs., the former being the ordinary weight of those seen in the market. They are among the most swift, strong, and voracious of fishes; they will bite eagerly at any object drawn rapidly through



Bluefish (Temnodon saltator).

the water, and advantage is taken of this to catch them by trolling in sail boats; so sharp are their teeth that it is necessary to wire the line for a short distance above the hook or spoon. It is so terrible a foe to the mackerel, that the scarcity of the latter fish on the New England coast in 1857 was attributed by the fishermen mainly to its presence. It generally swims near the surface. Toward the latter part of summer it is most excellent eating. It runs up the mouths of rivers even to quite fresh water, being taken in the Hudson as high up as Sing Sing, in the Delaware at Philadelphia, and in the Potomac as far up as Acquia creek. It ranges far along the coasts of North and South America, and, in the opinion of Valenciennes, inhabits as a single species both oceans. It is erratic in its habits, and on some coasts does not appear for many years and then suddenly returns in great numbers. During the last half of the 18th century and the first half of the 19th it disappeared entirely from the coast of New England.

BLUEING OF METALS, the process of giving a blue color to metallic substances by heat. Iron when heated becomes first of a light, then of a darker gold color, and finally blue. Steel heated to redness and suddenly cooled is rendered hard and brittle. It is restored to any degree of softness by heating it up to certain temperatures and allowing it to cool slowly. These temperatures are precisely indicated by the color of the film of oxide which forms upon its surface. The first perceptible tint is a light straw color, which is produced by the lowest degree, and indicates the hardest temper; the heat required is from 430° to 450° F.; it is used for lancets, razors, and surgical instruments. At 470° a full yellow is produced; it is the temper fitted for scalpels, penknives, and fine cutlery. The temperature of 490° gives a brown yellow, which is the temper for shears intended for cutting iron. At 510° the first tinge of purple shows itself; this is the temper employed for penknives. The purple hue which appears at 520° is the tint for table and carving knives. A temperature from 530° to 570° produces various shades of blue, such as are used for watch springs, sword blades, saws, and instruments requiring great elasticity. The different degrees of heat may be exactly regulated by plunging the articles in an oil bath, the temperature of which is ascertained by means of thermometers. Blacksmiths usually temper their cold chisels, drills, and other tools, by chilling them from a red heat by immersion in water; a bright spot is then filed upon the point, which is then heated in the forge until this spot has assumed the desired color.

BLUE LAWS, a term sometimes applied to the early enactments of several of the New England states, but more frequently limited to the laws of New Haven colony. The origin of the term is not exactly known. The most probable derivation is that given by Professor Kingsley, who thinks the epithet "blue" was applied to any one who in the times of Charles II. looked with disapprobation on the licentiousness of the times. Thus, in Hudibras,

> For his religion, it was fit
> To match his learning and his wit;
> 'Twas Presbyterian true blue.

In the colonies this epithet was applied not only to persons, but to the customs, institutions, and laws of the Puritans. Hence, probably, a belief with some that a distinct system of laws, known as the blue laws, must somewhere have had a local habitation. The existence of such a code of blue laws is fully disproved. The only authority in its favor is Peters, who is notoriously untrustworthy. The traditions upon this subject, from which Peters framed his stories, undoubtedly arose from the fact that the early settlers of New Haven were uncommonly strict in their application of the "general rules of righteousness." Judge Smith, in his continuation of the history of New York, published in "New York Historical Collections," vol. iv., gives evidence against the existence of the blue laws, which is particularly valuable, as it was put on record some 15 years before Peters's history was published. He writes: "Few there are who speak of the blue

laws (a title of the origin of which the author is ignorant), who do not imagine they form a code of rules drawn up for future conduct, by an enthusiastic precise set of religionists; and if the inventions of wits, humorists, and buffoons were to be credited, they must consist of many large volumes. The author had the curiosity to resort to them when the commissioners met at New Haven for adjusting a partition line between New York and Massachusetts in 1767; and a parchment-covered book of demi-royal paper was handed him for the laws asked for, as the only volume in the office passing under this odd title. It contains the memorials of the first establishment of the colony, which consisted of persons who had wandered beyond the limits of the old charter of Massachusetts Bay, and who, as yet unauthorized by the crown to set up any civil government in due form of law, resolved to conduct themselves by the Bible. As a necessary consequence, the judges they chose took up an authority which every religious man exercises over his own children and domestics. Hence their attentions to the morals of the people in instances with which the civil magistrate can never intermeddle in a regular well policed constitution, because to preserve liberty they are recognizable only by parental authority." "The good men and good wives were admonished and fined for liberties daily corrected, but never made criminal by the laws of large and well poised communities; and so far is the common idea of the blue laws being a collection of rules from being true, that they are only records of convictions consonant in the judgment of the magistrates to the word of God and the dictates of reason." See also Palfrey's "History of New England," vol. ii., p. 32, note.

BLUE LICK SPRINGS, a village of Nicholas co., Kentucky, on Licking river, 40 m. N. E. of Frankfort; pop. in 1870, 751. It is celebrated for its mineral waters, which form an article of considerable traffic in various parts of the United States. They contain soda, magnesia, lime, sulphuretted hydrogen, and carbonic acid, in combination with muriates and sulphates.

BLUE MONDAY, originally so called from a fashion, prevalent in the 16th century, of decorating the churches on the Monday preceding Lent with blue colors. It was celebrated as a general holiday, and the excesses frequently committed during the revels led to stringent enactments on the subject, amounting almost to an abolition of the custom.

BLUE MOUNTAINS. I. The central mountain range of the island of Jamaica. It extends E. and W. through the centre of the island, with offsets covering its eastern portion. The main ridges are from 6,000 to 8,000 ft. high, and are flanked by lower ranges, gradually sloping off into verdant savannahs. These mountains are remarkable for their steep declivities and sharp, narrow crests, which are sometimes only a few yards across. They cover the greater part of the island, the level portions being estimated at not more than $\frac{1}{20}$ part of the whole. The valleys are deep longitudinal depressions, covered, as are also the sides of the mountains, with dense vegetation and stately forests. In the great earthquake of 1692 these mountains were terribly shattered and rent. **II.** A range in the S. E. part of New South Wales, extending through the counties of Cook, Roxburgh, and Westmoreland, nearly parallel with the coast, and forming the dividing ridge between the rivers of the coast and those of the interior. These mountains attain a considerable elevation, Mt. Beemarang, believed to be the loftiest peak, having a height of 4,100 ft. The road which crosses them, built in 1813, is in places 3,400 ft. high. The range consists of ferruginous sandstone.

BLUE RIDGE, the most eastern of the principal ridges of the Appalachian chain of mountains. It is the continuation S. of the Potomac of the same great ridge which in Pennsylvania and Maryland is known as the South mountain. It retains the name of Blue Ridge till it crosses the James river, from which to the line of North Carolina its continuation is called the Alleghany mountain. Running through North Carolina into Tennessee, it again bears the name of Blue Ridge. (See Appalachian Mountains.)

BLUE RIVER, a river of Indiana, rising in Henry county in the eastern part of the state, takes a S. W. course, and joins Sugar creek, in Johnson county, after which it takes the name of Driftwood fork, or East fork of White river. Above Sugar creek it is from 30 to 60 yards wide, and affords excellent water power. The towns of Shelbyville and Newcastle are on its banks.

BLUE STOCKINGS, a title which originated in England in the time of Dr. Johnson for ladies who cultivated learned conversation. Dr. Doran relates that in 1757 it was much the fashion for ladies to form evening assemblies where they might participate in talk with literary and ingenious men. One of the most eminent talkers on these occasions was a Mr. Stillingfleet, who always wore blue stockings, and his absence at any time was so regretted that it used to be said, "We can do nothing without the blue stockings." The title was by degrees transferred, first to the clubs of this kind, and then to the ladies who attended them. It soon became a general appellation for pedantic or ridiculously literary ladies. One of the most famous of these clubs was that which met at Mrs. Montagu's, which was sometimes honored by the presence of Dr. Johnson, and the principal members of which have been sketched and eulogized by Hannah More, in her poem entitled "The Bas Bleu."

BLUE VITRIOL. See Copper, vol. v., p. 318.

BLUET D'ARBÈRES, Bernard, a professional French fool, born about 1566, died in 1606. In boyhood he was a shepherd, afterward a cart-

wright, and then fool to a Savoyard nobleman. At the age of 34 he went to Paris, and assumed the titles of *comte de Permission* and *chevalier des ligues des XIII. cantons suisses.* He wrote eulogies for the great, on whose bounty he lived, particularly on that of Henry IV., and afterward wrote prophecies for the people. His works were collected into 173 books, of which about 130 have come down to us. In 1831, a copy of Bluet was sold in England for £20 sterling. It is said that when the plague of 1606 ravaged Paris, Bluet announced that his total abstention from food for nine days would save the city. He died on the sixth day.

BLUM, Robert, a German revolutionist, born in Cologne, Nov. 10, 1807, executed in Vienna, Nov. 9, 1848. He was the son of a journeyman cooper, and at the age of twelve obtained employment as mass servant, but afterward found occupation in a lantern manufactory and was promoted to the counting house. He accompanied his employer on journeys through the southern states of Germany, and in 1829–'30 resided with him at Berlin. Summoned in 1830 to the military service, he was dismissed after six weeks and returned to Cologne, where he was employed as man of all work at the theatre. In 1831 he was appointed cashier and secretary of the Leipsic theatre, a post he held till 1847. From 1831 to 1837 he made contributions to the Leipsic family papers, such as the *Komet*, the *Abendzeitung*, &c., and published a "Theatrical Cyclopædia," "Friend of the Constitution," an almanac entitled *Vorwärts*, &c. In 1840 he became one of the founders, and in 1841 one of the directors of the Schiller association, and of the association of German authors. His contributions to the *Sächsische Vaterlandsblätter*, a political journal, made him the object of government persecution. German Catholicism found a warm partisan in him. He founded the German Catholic church at Leipsic, and became its spiritual director in 1845. On Aug. 12, 1845, when an immense meeting of armed citizens and students threatened to storm the riflemen's barracks at Leipsic, Blum by his eloquence prevented a riot. The Saxon government continued its persecution against him, and in 1847 suppressed the *Vaterlandsblätter*. On the outbreak of the revolution of February, 1848, he became the centre of the liberal party of Saxony, founded the "Fatherland's Association," which soon mustered above 40,000 members, was vice president of the preliminary German parliament assembled at Frankfort, after its dissolution a member of the committee it left behind, and ultimately representative of the city of Leipsic in the regular parliament. His political theory aimed at a German republic based on the different traditionary kingdoms, dukedoms, &c.; since, in his opinion, the latter alone were able to preserve intact what he considered a peculiar beauty of German society, the independent development of its different orders. When the news of the Vienna insurrection of Oct. 6 reached Frankfort, he, in company with Fröbel, carried to Vienna an address drawn up by the parliamentary opposition, which he handed to the municipal council of Vienna, Oct. 17. Having enrolled himself in the ranks of the students' corps, and commanded a barricade during the fight, he was taken prisoner, and, after the capture of Vienna by Windischgrätz, sentenced to the gallows, a punishment commuted to that of being shot. This execution took place at daybreak, in the Brigittenau.

BLUMENBACH, Johann Friedrich, a German naturalist, born at Gotha, May 11, 1752, died in Göttingen, Jan. 22, 1840. His father was a teacher. His love of science was first kindled when he was only 10 years of age, by the sight of a human skeleton in the house of a physician, the friend of his father. While a schoolboy he made collections of human skulls and the bones of animals as a basis for comparative anatomy. At the age of 17 he commenced the study of medicine at Jena, where he remained three years, and afterward went to Göttingen, where he obtained his degree of doctor of medicine in 1775. On that occasion he wrote a thesis on the different varieties of the human race, *De Generis Humani Varietate Nativa*, in which he developed the germ of those craniological researches and comparisons for which he afterward became celebrated. In the following year he was appointed junior professor of medicine at Göttingen and keeper of the cabinet of natural history, and two years later (1778) regular professor. From 1780 to 1794 he edited a scientific publication, the *Medicinische Bibliothek*, for which he wrote many valuable articles on medicine, physiology, and comparative anatomy. He also obtained a reputation by the publication of his *Institutiones Physiologicæ*, a condensed and well arranged view of the animal functions; the work appeared in 1787, and during a period of 34 years passed through many editions in Germany, where it was the general text book in the schools. It was rendered into English by Dr. Caldwell, and published in America in 1798, and in London, by Elliotson, in 1817. Blumenbach became still more extensively known by his manual of comparative anatomy and physiology (*Handbuch der vergleichenden Anatomie und Physiologie*), of which three editions were published in Germany from 1804 to 1824. It was translated into English in 1809 by the eminent surgeon Lawrence; and again with the latest additions and improvements, by Coulson, in 1827. Though less elaborate than the works of Cuvier and Carus, this work of Blumenbach will always be valued for the accuracy of his own observations, and the just appreciation of the labors of his predecessors. Blumenbach was the first who placed comparative anatomy on a truly scientific basis. In 1785, long before Cuvier's time, he instituted the

method of comparing different varieties of human skeletons as well as skeletons of animals. Camper had only compared the facial angles of the skulls of Europeans, negroes, and orang-outangs; Blumenbach perceived the insufficiency of these few points of comparison, and introduced a general survey of comparative anatomy. He insisted on the necessity of comparing the whole cranium and face, to distinguish the varieties of the human race; and his numerous observations were published in the *Collectio Craniorum Diversarum Gentium*, published at Göttingen, in 7 decades, from 1790 to 1828, in 4to, with 80 figures, and in the *Nova Pentas Collectionis suæ Craniorum*, which was joined to the work in the latter year. The ethnological division of mankind into five races, called respectively the Caucasian, the Mongolian, the Malay, the Ethiopian, and the American, was first proposed by Blumenbach, and for many years had popular currency, though now discarded as inadequate by most ethnologists. The greatest part of Blumenbach's life was passed at Göttingen. In 1783 he visited Switzerland, and gave a curious medical topography of that country in his *Bibliothek*. In 1788 he was in England, and also in 1792. The prince regent in 1816 conferred on him the office of physician to the royal family in Hanover, and in 1821 made him knight companion of the Guelphic order. The royal academy of Paris adopted him as a member in 1831. In 1825 Blumenbach celebrated the 50th anniversary of his inauguration as a doctor of medicine, and in 1826 of his professorship. In 1835 he retired from public life, and only lectured privately to select audiences.

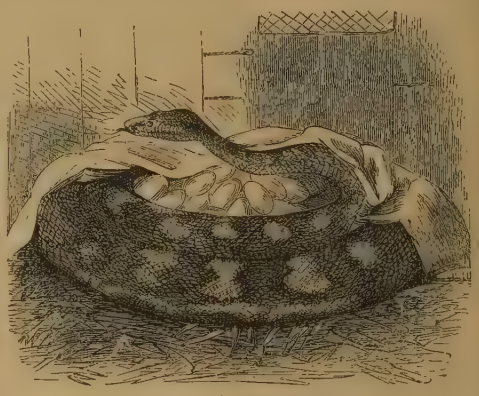
BLUNT. I. Edmund March, an American hydrographer, born at Portsmouth, N. H., June 20, 1770, died at Sing Sing, N. Y., Jan. 2, 1862. His "American Coast Pilot," describing every port on the coasts of the United States, has proved a useful work to seamen throughout the world. It was commenced by him in 1796, and the 24th edition was published by his son G. W. Blunt of New York in 1869; and it has been translated into most of the European languages. His other nautical works, charts, &c., are numerous. **II. Edmund,** son of the preceding, born in Newburyport, Mass., Nov. 23, 1799, died in Brooklyn, N. Y., Sept. 2, 1866. At the age of 17 he surveyed the harbor of New York; and from that time up to 1833 he was engaged in surveys in the West Indies, Guatemala, and the seacoast of the United States, on his private account. In 1833 he was appointed a first assistant in the U. S. coast survey, in which office he continued till his death. He was also a member of the firm of E. and G. W. Blunt, nautical publishers of New York. Mr. Blunt while on the coast survey advocated and procured the introduction of the Fresnel light in American lighthouses.

BLUNT, John James, an English divine, born at Newcastle-under-Lyme in 1794, died in Cambridge, June 17, 1855. He obtained a fellowship in the university of Cambridge in 1816, and being appointed in 1818 one of the travelling bachelors, visited Italy, and wrote a volume on the "Vestiges of Ancient Manners and Customs discoverable in Modern Italy and Sicily" (1823). He held various ecclesiastical appointments till 1839, when, on the death of Bishop Marsh, he was elected Lady Margaret's professor of divinity. His principal works are: "Undesigned Coincidences in the Writings both of the Old and New Testaments an Argument of their Veracity" (1847; 5th ed., 1856); "History of the Christian Church in the first three Centuries" (2d ed., 1856); and "Sketch of the Reformation of the Church of England," which passed through 15 editions, and was translated into French and German.

BLUNTSCHLI, Johann Kaspar, a German jurist and statesman, born in Zürich, Switzerland, March 7, 1808. He studied under Savigny at Berlin and under Niebuhr at Bonn, where he graduated in 1829. He was employed in the judiciary at Zürich and as teacher at the university (1830), and subsequently as professor, and member of the grand council (1837) and of the local government (1839). In opposition to the radicals, he founded a liberal-conservative party, and energetically, but in vain, exerted himself to prevent the civil war of 1847. After the downfall of the Sonderbund, and the decided victory of radicalism, he left Switzerland and became professor of German and international law at Munich (1848), and since 1861 he has been professor of political science at Heidelberg. He was active in 1862 in favor of a German house of representatives as a step toward national unity, and as a member of the Baden upper house in the cause of parliamentary reform. In conjunction with Baumgarten and other reformers he founded in 1864 the Protestant union, was president of the Protestant conventions at Eisenach (1865), Neustadt (1867), Bremen and Berlin (1868), and of the Baden general synod (1867). After the victory of Prussia over Austria in 1866 he favored an intimate union between North and South Germany, and was elected in 1867 to the *Zollparlament* (customs parliament). His works include *Staats- und Rechtsgeschichte der Stadt und Landschaft Zürich* (2 vols., 1838–'9; 2d ed., 1856); *Geschichte des Schweizerischen Bundesrechts* (2 vols., 1846–'52); *Allgemeines Staatsrecht* (2 vols., Munich, 3d ed., 1863); *Deutsches Privatrecht* (1853; 3d ed., 1864); and *Geschichte des allgemeinen Staatsrechts und der Politik* (1864), the last named being the first of a series of works relating to the history of the various sciences, the publication of which was proposed by Maximilian II., the late king of Bavaria. Among the other works which make him a high authority on international and political sciences and law and the laws of war are: *Das moderne Kriegsrecht der civilisirten Staaten als Rechtsbuch dargestellt* (Nördlingen,

1866); *Das moderne Völkerrecht als Rechtsbuch mit Erläuterungen* (Nördlingen, 1868; French translation, by Lardy, Paris, 1869); *Das moderne Völkerrecht in dem Französisch-Deutschen Kriege von* 1870 (Heidelberg, 1871); and *Das Deutsche Staatswörterbuch*, in conjunction with Brater (11 vols., 1857–'70).

BOA, a large serpent of the family *boidæ*, order *ophidia*. This family is known by the following characters: The under part of the body and tail is covered with transverse bands, each of a single piece, narrow, scaly, and often six-sided; there is neither spur nor rattle at the tip of the tail; the hinder limbs, formed of several bones, are developed into an exserted horny spine or hook on each side of the vent; the body compressed, larger toward the middle; the tail short and prehensile; the pupil oblong and erect; and scales small, at least on the hinder part of the head. They are the largest of serpents, and though without venom, their immense muscular power enables them to crush within their folds large animals, which they first lubricate with saliva, and then swallow whole by their enormously dilatable jaws and gullet.—It appears that serpents of this family once existed in Italy, Greece, and the Mediterranean regions of Africa. Virgil's description of the death of Laocoön and his two sons, as well as the magnificent marble group which either furnished the subject for his description, or was suggested to the sculptor by it, and again the account in the 24th idyl of Theocritus of the serpents sent by Juno to destroy the infant Hercules in his cradle, all show that the artists were perfectly acquainted with the action of constricting serpents. The narrative by Valerius Maximus of the gigantic serpent which had its lair by the waters of the river Bagradas (Mejerda), not far from Utica, or the present site of Tunis, and kept the whole army of Regulus at bay, killing many of his soldiers, until it was at length destroyed by stones cast from the engines used in the siege of cities, is familiar to most readers. Pliny adds that the serpents called *boæ* in Italy confirm this; for that they grow so large that one killed on the Vatican hill in the reign of Claudius had the entire body of an infant in its belly. Suetonius mentions the exhibition of a serpent of 50 cubits (75 feet) in length, in front of the Comitium. These reptiles, which are now found in tropical countries only, have been distinguished into 25 genera, under which are arranged, according to characteristic differences, the serpents in the British museum. Among these genera, most of which contain several species, are the following: I. *Python*, two species, distinguished from the boas by placing its eggs in groups, and covering them with its body, a habit which had been doubted, but has been verified from observation of the proceedings of a python in the *jardin des plantes* at Paris: the *ular sawad* of Hindostan, Ceylon, and Borneo, and the rock snake of Java. The former is one of the largest and most terrible of all these monsters, said to grow to 30 ft. in length, and proportionally stout, and to be able to manage a full-grown buffalo.



Female Python incubating.

There have been living specimens of both these snakes in the zoölogical gardens, Regent's park, London. II. *Hortalia*, three species, all of South Africa: the Natal rock snake, 25 ft. long, and as large as the body of a stout man; the Guinea rock snake, of which there was a

Natal Rock Snake (Hortalia Natalensis).

specimen in the Regent's park; and the royal rock snake, supposed to weigh over 100 lbs. III. *Boa*, four species, peculiar to Mexico, Honduras, Santa Lucia, and Peru. This is the genus which has given the general name to the whole family of great constricting serpents. The skin of one of these serpents, of the first species, *boa constrictor*, the *tlicoatl* and *temacuilcahuilia* of the Mexicans, and the object of their serpent worship, is preserved in the British museum. The proper boa is decided by Cuvier not to be a native of any portion of the old world. IV. *Eunectes*, one species, the native of tropical America; this is the anaconda, a name said to be of Ceylonese origin, which, like that of boa, has been vulgarly given to the whole family. (See Anaconda.)—This is the most terrible class of destructive reptiles in ex-

istence. Their long, keen teeth are curved strongly backward, each tooth in either jaw fitting between the interstices of two in the

Boa Constrictor.

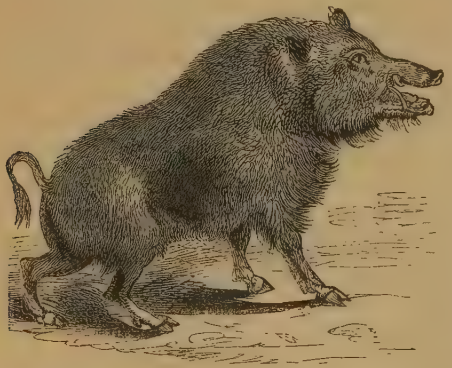
other, clasping whatever they seize upon inextricably. The body is readily wound about the victim in huge knots, compressed closer and closer until life is extinct. Mr. McLeod, who wrote a narrative of the voyage of H. M. S. Alceste, in which was brought over to England from the island of Borneo a serpent of the family of *boidæ*, 16 ft. long and 18 inches in circumference, describes their process of constriction. A goat was put into the cage of the boa every three weeks and swallowed, not by the power of suction, but by the effect of muscular contraction, assisted by two rows of strong, hooked teeth. This snake was 2 hours and 20 minutes employed in gorging the goat, during which time, particularly while the animal was in the jaws and throat of the constrictor, the skin of the latter was distended almost to bursting, while the points of the horns could be seen, threatening as it were at every moment to pierce the scaly coat of the destroyer. The snake coiled himself, and remained torpid for three weeks, during which he so completely digested and converted to his own use the whole of the goat, that he passed nothing from him but a small quantity of calcareous matter, not equal to a tenth part of the bones of the animal, and a few hairs; and at the end of that time was in condition to devour another goat. Mr. Broderip, the author of "Leaves from the Note Book of a Naturalist" and the "Zoölogical Journal," describes in almost the same words the killing and deglutition of a rabbit, which he observed in the tower of London. The time required to kill the rabbit was eight minutes. In every respect, indeed, Mr. Broderip corroborates the observations of Mr. McLeod, except on one point, whether the respiration of the serpent is suspended during the act of swallowing, which Mr. McLeod affirms and Mr. Broderip denies, although without dissection the mode of his breathing cannot well be determined.

BOADEN, James, an English dramatist and biographer, born at Whitehaven in 1762, died in 1839. He was a painter, but abandoned the art, and wrote plays, none of which now keep possession of the stage. He also wrote lives of John Kemble, Mrs. Siddons, Mrs. Jordan, and Mrs. Inchbald, and an "Inquiry into the Authenticity of the various Pictures and Prints of Shakespeare" (London, 1824), directed against what is called Talma's portrait of Shakespeare, and accepting the Chandos portrait as authentic.

BOADICEA, or **Boudicea,** queen of the Iceni, a British tribe inhabiting what are now the counties of Cambridge, Suffolk, Norfolk, and Hertford, died about A. D. 62. Her husband, Prasutagus, the king of the Iceni, dying, left the emperor Nero and his own two daughters joint heirs to his great wealth, hoping thereby to preserve his family and kingdom from the rapacity of the conquerors. But his kingdom was immediately taken possession of by the Roman centurions. For some real or imaginary offence the British queen was publicly scourged, and her daughters were abandoned to the lust of the slaves. Taking advantage of the absence of Suetonius Paulinus, the Roman governor, from that part of England, Boadicea raised the whole military force of her barbarians, and bursting at their head upon the Roman colony of London, burned the city and put to the sword in that and neighboring places at least 70,000 Roman citizens, traders, Italians, and other subjects of the empire. Suetonius hurried to the scene of action from the Isle of Man. The queen of the Iceni was in command of 120,000 troops, which gradually increased to as many as 230,000, according to Dion Cassius, while Suetonius could bring into the field fewer than 10,000 soldiers. The battle was fiercely contested, and Boadicea displayed great valor; but her troops being finally obliged to yield to the disciplined Romans, she took poison. The victors spared nothing; women, children, the beasts of burden, the dogs, were all cut to pieces. It is said that 80,000 Britons were butchered that day, while of the legionaries only 400 fell, and about as many more were wounded. It is believed that the action took place not far from Verulamium (St. Albans), a Roman colony, which at the first irruption had shared the fate of London.

BOAR (*sus aper*), the male swine. The domestic hog and the wild boar of Europe, Africa, and Asia are, generally speaking, of the same species, and will breed together and produce young capable of propagating their kind. It appears that the most improved of the English and American domesticated breeds are, for the most part, largely crossed and intermixed with the Chinese and perhaps the Turkish varieties. In America, Australia, and the Polynesian group, the hog was unknown origi-

nally in a natural condition; but having been turned out everywhere by the early navigators who discovered the coasts and islands of the Pacific, he has propagated his species so rapidly that he is now everywhere abundant, both in confinement and in a state of nature. The South American forests in particular are inhabited by vast droves, which have relapsed into primitive wildness; while in the more woody parts of Virginia, the western states, and Canada, the domestic hog has become about half wild. The characteristics of the boar are the formidable recurved tusks or canine teeth, two of which proceed from the upper and two of yet more formidable dimensions from the lower jaw, with which it inflicts wounds of the most terrible description, ripping in an upward direction, and aiming especially at the soft parts, as the belly, flanks, and groin of the horse, dog, or man, which comes in his way with hostile intentions.—A singular variety of the boar is the babyroussa of the East Indian archipelago. (See BABYROUSSA.) The



Wild Boar (Sus aper).

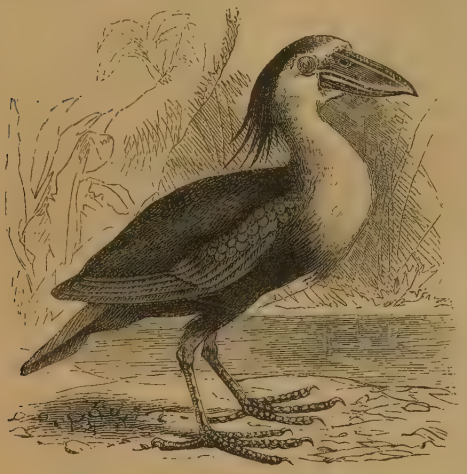
peccary of South America, which was formerly classed with the wild boar, has been lately distinguished as an entirely separate animal.—The boar, whether wild or domestic, has far coarser bristles than the sow, and the wild animal as far exceeds the tame in that particular as in his strength, size, ferocity, and the largeness of his tusks. Where the domestic animal has the free range of forest lands, in which it can feed on acorns, beech mast, and the fruit of the sweet chestnut, the flesh is proportionally valued; and it is on this account that the pork of Virginia has obtained a celebrity in America equal to that of Westphalia in Europe. No other reason tends so materially to give its superior excellence to the flesh of the wild over that of the tame hog, which has been admitted in all ages. It is singular, however, that the flesh of the boar in its wild state is much superior to that of the sow; while in the domesticated animal that of the male, unless castrated, is so rank as to be uneatable.—During the middle ages the wild boar abounded both in England and France, and hunting the boar was the most esteemed of all field sports. The boar goes to run, as it is called, in December, after which time his flesh is uneatable; the season for hunting him commences in September, when he is in his most perfect condition. A wild boar in his first year is called a pig of the saunder; the next year, a hog of the second; then, a hogsteer; in the fourth year, when he leaves the saunder, a boar; and after that a sanglier. A boar is farrowed with his full number of teeth, which only increase in size, especially the tusks of the lower jaws, which are those with which he strikes, those of the upper jaws being used only to whet the others. Boars were hunted in Europe in two ways, either by tracking them into their holts or dens, which were then surrounded by nets or toils, and the boars driven into them, or what was called at force with dogs, when the beast was roused from his lair, and hunted with relays of hounds, until he turned to bay, when he was despatched with the boar spear or hunting sword. In England the wild boar has long been entirely extinct; in France it is still found in parts of Brittany and Normandy; and in parts of Germany, in Holstein, in Italy (especially in the Pontine marshes), and in many parts of Greece and Asia Minor, it is still abundant. While boar hunting was in its palmy force, a particular dog was cultivated for the sport, which was of great rarity and value. It appears to have been a half-bred dog, between the bloodhound and the mastiff. There was, however, a dog more or less homogeneous, known as the boar hound; the best came from Pomerania, and were one of the choicest gifts presented to crowned heads. Boar hunting, or pig sticking, as it is there called, is still a favorite sport in British India, especially in the Deccan, where hogs abound in the reedy jungles of the plains. The hunters are mounted on Arab coursers, and pursue their game without the aid of dogs, running him to bay by the mere speed of their horses. It is said that a hog, if he gets a moderately good start, can maintain a pace for 20 or 25 minutes equal to the fastest horse with fox-hounds. The weapon is a lance of tough bamboo about 10 ft. long, with a steel head shaped like a laurel leaf, and as keen as a razor. This is grasped usually at about 18 inches from the butt, overhandedly, so that the shaft extends nearly horizontally backward, but with a downward inclination, the head, or blade, being in the rear of the horse's croup. When the boar charges, which he does right at the horse's fore legs, often cutting his shanks to the bone with his terrible tusks, and, if he do not wheel off in time, ripping out his intestines, the horseman, rising in his stirrups, strikes him an overhanded stab, delivered perpendicularly downward, between the shoulders, making his horse pivot to the left, on his hind legs.

BOARDMAN. I. George Dana, an American missionary, born in Livermore, Me., Feb. 8, 1801, died in Burmah, Feb. 11, 1831. In 1819 he entered the Waterville academy, which was

organized as a college in 1820, and graduated in 1822. He was immediately elected tutor, and his friends hoped that he would remain as a professor; but after about a year he determined to devote himself to the work of Christian missions. For a time he thought of laboring among the American Indians; but intelligence of the death of James Coleman of the Aracan mission induced him to offer himself to the Baptist board of foreign missions in 1823, and the same year he entered Andover theological seminary. He was ordained at W. Yarmouth, Me., Feb. 16, 1825, was married to Miss Sarah Hall July 4, and on July 16 sailed for Calcutta. Arriving there Dec. 2, he found several missionaries who had been driven from Burmah, and learned that Mr. and Mrs. Judson were in a Burman prison. It being necessary to wait until Burmah should be reopened to missionary labor, he spent the interval in acquiring the language, and in April, 1827, joined Mr. Judson at Amherst. Maulmain, the new seat of the English government, was chosen for the location of a mission, and Mr. Boardman was selected to superintend it. This mission was planted the same year, and became ultimately the radiating point of influence for the Baptist missions in Burmah. To his prudence, piety, and organizing force is largely due this success. In a few months the station at Amherst was abandoned, and the whole missionary force concentrated at Maulmain. It was then decided to establish another station at Tavoy, about 150 miles down the coast, and Mr. Boardman was unanimously chosen for this difficult work. He was accompanied by Ko Tha-byoo, a Karen convert and candidate for baptism, a Siamese lately baptized, and a few boys from his school at Maulmain. He reached Tavoy early in April, 1828, and baptized Ko Tha-byoo—a man whose labors and success among his countrymen have become historic. Through his influence a few persons were brought under the instructions of Mr. Boardman. These carried into the jungles the news that a white teacher had brought from beyond the sea the knowledge of the true God, and companies began to come from a distance to see and hear for themselves. Mr. Boardman now matured plans for the systematic instruction of the Burman population of Tavoy, by means of schools and other instrumentalities; and having been urgently invited, he set out Feb. 5, 1828, on a first missionary tour among the Karen villages. He was absent ten days, meeting with such success that he entered upon a systematic course of itinerary labors. Usually accompanied by Ko Thabyoo or some other convert, and some of the boys from the school, he would visit three or four villages in a week, preaching in zayats, going from house to house, and conversing with those whom he met by the wayside. Sometimes he made boat trips on the river. During three years he maintained an almost incredible activity, in spite of interruptions occasioned by frequent sickness and repeated deaths in his family, and while he was sinking under consumption. The only cessation of his labors was on the occasion of his wife's visit to Maulmain after her recovery from a dangerous illness. He remained with her about seven months, but this seeming respite was only a change in the form of his work, as he preached twice a week in English and once in Burmese, attended catechetical exercises three evenings in a week, and daily corrected proofs for the press. Before leaving Tavoy for Maulmain he promised the Karens that he would visit them again in the jungle on his return. On Jan. 31, 1831, he left Tavoy in a litter to fulfil that promise, and reached his destination, but was too ill to accomplish more than part of the task. He set out to return to Tavoy, but died before reaching there. Though only 30 years of age when he died, he had accomplished what few men attain in a long life. He left 70 members of the mission church at Tavoy, and within a few years thousands of Karens were converted through the agencies which he had organized and set in motion. See "Memoir of George Dana Boardman," by the Rev. A. King (new ed., Boston, 1856). **II. George Dana,** D. D., a Baptist clergyman and scholar, son of the preceding, born at Tavoy, Burmah, Aug. 18, 1828. He graduated at Brown university in 1852, and at Newton theological institution in 1855, and was ordained the same year at Barnwell, S. C. The state of public sentiment on the slavery question led him to remove in 1856 to Rochester, N. Y., where he remained pastor of the second Baptist church till 1864. He was then called to the first Baptist church in Philadelphia, his present charge (1873). His publications have been numerous but fragmentary, comprising sermons, addresses, and articles in quarterly reviews. He has travelled extensively in Europe and the East.

BOATBILL (*cancroma cochlearia*, Linn.), a bird of the order *grallæ*, family *ardeidæ*, so called from the peculiar form and breadth of the bill, which is much depressed, very broad toward the middle, with the sides gradually compressed at the end; the culmen has a prominent keel, with a deep lateral groove extending to the tip, which is hooked. The wings are moderate; the tail short and rounded; the tarsi rather longer than the middle toe, slender, and covered in front with large irregular scales; the hind toe long, and the claws short, curved, and acute; the length of the bill is about four inches, and of the bird two feet. The general color is whitish, with a grayish back, the belly rufous; the forehead white, behind which is a black cap, furnished in the male with a long crest. This bird is nearly allied to the herons, and is found in the tropical parts of South America; until recently it has been supposed to be the only species of the genus. It frequents marshy places and the banks of rivers where the tides do not ascend; it perches on the trees overhanging

fresh water, darting thence on fishes which happen to swim beneath it; from its generic name, it is supposed to feed also on crabs,



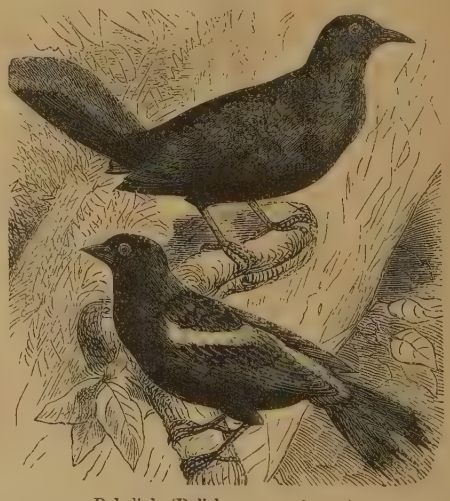
Boatbill.

which it could readily crush in its powerful bill; on the ground it has very much the gait, attitudes, and air of the herons. It is sometimes called "savacou."

BOAVISTA, or **Bonavista,** an island of Africa, the easternmost of the Cape Verd islands, in lat. 16° 13′ N., lon. 22° 56′ W.; pop. about 3,000. The island is pentagonal in form, about 20 m. in length, and has two basaltic peaks in the centre. The manufacture of salt is the chief occupation of the inhabitants. There are three ports for large vessels, Porto Sal Rey, Porto do Norte, and Porto Curralinho. Rabil is the capital.

BOBADILLA, Francisco de, a Spanish governor of Hispaniola or Santo Domingo, died June 29, 1502. Owing to the complaints of maladministration against Columbus made by the colonists of Santo Domingo, it was determined by Ferdinand and Isabella to despatch a commissioner to inquire into the condition of that colony; and Bobadilla, a knight of Calatrava, and an arrogant, incompetent person, was selected for this office in 1500. He was intrusted with unlimited powers, which upon his arrival at Santo Domingo he immediately exerted by arresting Columbus, putting him in chains, and sending him to Spain. The outrage excited general indignation in Spain, and was regarded as a national dishonor. Columbus was reinstated in his honors and emoluments, and before his departure upon his fourth voyage orders had already been sent for the recall of Bobadilla, under whose administration disorders had multiplied to an alarming extent. Columbus landed again in the harbor of Hispaniola on the day when the fleet bearing Bobadilla and other enemies of Columbus started for Spain. This fleet was hardly out of sight when it was wrecked by a hurricane and Bobadilla perished.

BOBOLINK, or Rice Bunting (*emberiza oryzivora*, Linn.; *dolichonyx oryzivorus*, Swains.), the rice bird or ortolan of Georgia and Carolina, the reed bird of the middle states, and the bobolink of the north and northwest, migratory through the whole length of the North American continent and islands, from Labrador to Mexico and the Antilles. The plumage of the male bird is entirely different at various seasons. The bobolink winters mainly in the western isles, and not in the tropical parts of this continent. Early in spring the birds begin to appear in the southern states in small parties, the females often preceding the males, tarrying only a few days, seen only in small companies, and for the most part making their journeyings by night. In the first days of May they appear in Massachusetts, gayly clad in full dress, and in full song, and at this period are neither gregarious nor predatory, though on their northern voyage they damage the crops of young grain. The length of the bobolink is about 7½ inches; the male, in his spring dress, has the upper part of the head, shoulders, wings, tail, and the whole of the under plumage black; lower part of the back bluish white; scapulars, rump, and tail coverts white; there is a large patch of brownish yellow on the nape and back of the neck; bill bluish black, which in the female, young male, and adult, after the month of June, is pale flesh color; the feathers of the tail formed like a woodpecker's; legs brown. The female, whose plumage the adult male assumes after the breeding season, has the back streaked with brownish black; the whole lower parts of a dull yellow. The young birds have the dress of the female. During the breeding season they frequent cool, grassy meadows, which



Bobolink (Dolichonyx oryzivorus).

they render vocal with their quick, merry song, the male singing to the female while she is sitting. "He chants out," says Wilson, "such a

jingling medley of short variable notes, uttered with such seeming confusion and rapidity, and continued for a considerable time, that it appears as if half a dozen birds of different kinds were singing all together. Many of the tones are in themselves charming, but they succeed each other so rapidly that the ear can hardly separate them. Nevertheless the general effect is good, and when 10 or 12 are all singing in the same tree, the concert is singularly pleasing." The female makes an inartificial nest of withered grass, in some depressed place in the meadows, and lays five or six eggs of purplish white, blotched all over with purplish stains, and spotted with brown at the larger end. During April, May, and June the males are constantly singing, and they neither congregate nor damage any crops; but toward the end of June they become silent, and gradually assume the coloring of the females, so that by the beginning of August the change is complete. They now assemble in vast flocks, mute with the exception of a short, sharp chirrup, and do some mischief to the latest crops of oats and barley; chiefly, however, they congregate in throngs along the river beds and lake margins, wherever the wild rice (*zizania aquatica*) grows abundantly. Along the Delaware and Schuylkill, as also on the borders of the New Jersey and many of the Virginia streams, they are much pursued by sportsmen. As the cool nights draw on, late in September and early in October, they quit their northern summering places for the southern rice fields, which they at times glean so completely that it is useless to attempt to gather the grain. Here they become so fat and sluggish that they can scarcely fly, and when shot are frequently known to burst open on striking the ground. Before the rice crop is fully gathered, they have already made their appearance in Cuba and Jamaica, where they repeat the same ravages on the seeds of the guinea grass (*sorghum*), and grow so fat that they receive the name of "butter birds."

BOBRUISK, a fortified town of Russia, in the government and 87 m. S. E. of the city of Minsk, on the right bank of the Beresina; pop. in 1867, 24,681, nearly one half of whom are Jews. The town is a station for packets navigating the Beresina, and carries on a brisk trade in corn and wood. It was first fortified by Alexander I., successfully resisted a siege by the French in 1812, and was raised by Nicholas to a fortress of the first class.

BOCA TIGRIS, or the Bogue, the entrance to the Canton river, China. It is a comparatively narrow passage, about 40 m. from Canton, and is called by the Chinese Hu Mun, or "The Tiger's Mouth," of which Boca Tigris is the Portuguese translation. There are two rocky islands in its centre, which were carefully fortified by the Chinese, and were considered by them impregnable. But since 1830 British squadrons have silenced them three times, and these once famous batteries are now dismantled.

Boca Tigris.

All that part of the estuary of Canton river which lies southward of the Bogue is known by the name of the "Outer Water."

BOCCACCIO, Giovanni, an Italian novelist, born in Paris in 1313, died at Certaldo, Dec. 21, 1375. His father was originally of Certaldo, but removed to Florence, where he amassed wealth, and filled several public offices. His mother was a French woman with whom his father formed an illicit connection while visiting Paris. Having determined on a commercial career for his son, his father removed him from his tutor, Giovanni da Strada, before his Latin course was completed, and as soon as he had acquired a sufficient knowledge of arithmetic apprenticed him to a merchant in Paris, with whom he remained six years. His master, finding that he profited nothing, finally sent him back to his father, who had sufficient penetration to discover that his son would never make a merchant, but thought that his studious habits might serve him in the legal profession. But the law proved as distasteful as commerce, and led to altercations between the youth and his father. After a while he again returned to commerce and fixed his residence in Naples. The king, Robert of Anjou, a friend and patron of Petrarch, was devoted to literature, and drew to his court the most eminent scholars of Italy. Boccaccio was well acquainted with Giovanni Barili, a man of erudition, and Paolo of Perugia, the king's librarian; and encouraged by them he entirely abandoned trade and gave himself up to the pursuit of learning. His father having consented to this on the condition that he should study the canon law, he applied himself to it for some time, took his doctor's degree, and after that found himself more at liberty to indulge his passion for poetry. In 1341, while at Naples, where he resided eight years, Boccaccio became acquainted with the princess Mary, the illegitimate daughter of King Robert. She was married, but became the avowed mistress of Boccaccio. At her instance he composed his romance of *Il Filocopo* and *L'Amorosa Fiammetta*, in the latter of which his lady, under the name of Fiammetta, bewails the loss of

Pamfilo, supposed to represent himself. The *Filocopo* is not skilfully constructed, and is filled with spectres, visions, and the powers of darkness; yet it contains passages of grace and vivacity, and touches of human nature in which the whole character is pictured in a single sentence. In 1342, while thus employed at Naples, he was summoned to Florence by the illness of his father. During his separation from the princess Mary he consoled himself by the composition of the romance of *Ameto*. On the completion of this work his father's recovery and marriage allowed him to return to Naples. The king died during his two years' stay in Florence, and his granddaughter Joanna ascended the throne amid great political disturbances. Boccaccio found his position more enviable than it had been before. He was not only happy from his connection with the princess, but possessed the favor of Acciajuoli, who had great power in Naples, and even the regard of Joanna herself. Boccaccio is said to have written many of the most licentious passages in his *Decamerone* in conformity with the queen's expressed desire. His father died in 1350, leaving a son by his wife, Bice de' Bosticchi, who was also dead, to the care of Boccaccio. The poet faithfully attended to his trust, and when in his paternal city became acquainted with Petrarch, whose example had a strong influence upon him, and turned his thoughts more from licentious pleasures to purer fame. Being now permanently settled in Florence, Boccaccio by Petrarch's advice began to take interest in affairs of state. He was sent on an embassy to Padua, to invite Petrarch to accept the presidency of the university. Several other missions followed, not very clearly described as to dates, and in April, 1353, he took part in one to Pope Innocent VI. at Avignon. In the same year was published his *Decamerone* or "Ten Days' Entertainment," a collection of 100 stories supposed to have been told by a party of ladies and gentlemen at a country house near Florence while the plague was raging in that city. This work is regarded as one of the purest specimens of Italian prose, and as an inexhaustible repository of wit, beauty, and eloquence, although deformed with licentious thoughts and descriptions. Like Petrarch, Boccaccio was a devoted collector of ancient manuscripts, and a diligent student of the classics. Both were travellers, and both employed much of their time and money in rescuing from destruction the precious memorials of antiquity. In 1359 Boccaccio visited Petrarch at Milan, conversed with him, as he informs us, at great length on the subjects of morality and religion, and determined to devote himself more seriously to holy studies. His resolution was confirmed by a warning sent him from Fra Petroni, who upon his deathbed declared, although he never had met Boccaccio, that he knew him in spirit, and that he must repent and prepare for death. The converted man accordingly wrote afterward in a strain altogether free from his former licentious vein, while he assumed the ecclesiastical habit and applied himself to theology. He was not wealthy, and a large part of his means had been spent in the collection of Greek manuscripts, his emissaries visiting many parts of Europe to procure them. Toward the decline of life he found himself poor and deserted by all his friends except Petrarch. That great poet wished his friend to take up his abode with him, but Boccaccio declined the offer, although he visited Petrarch whenever he found an opportunity. In 1362 he was invited to Naples by the grand seneschal Acciajuoli, but was so hurt by his cold reception that he soon left and went to Venice to meet Petrarch. On returning to Florence he took up his abode in a little cottage in Certaldo, in the vale of Elsa, dear to him as the birthplace of his family. From this retreat he was soon summoned by the chief citizens of Florence, to undertake an embassy to Urban V. at Avignon, and repairing to the papal court he experienced the most flattering reception. He was again sent to Urban in 1367, after the pontiff had removed to Rome; and the character of Boccaccio had now so completely changed from his former looseness that he was characterized by the bishop of Florence as one in whose purity of faith he had the utmost confidence. In 1368 he again visited Venice for a short time, and subsequently Naples, where Queen Joanna endeavored to persuade him to fix his abode. But the life at Naples had no attractions for him now, and he returned to Florence, where he was honored by the magistrates with a professorship founded in memory of Dante, for the better explication of the *Divina Commedia*. His lectures commenced in October, 1373, and continued till his death, which was doubtless hastened by the demise of Petrarch 17 months before his own. He bequeathed the little property remaining to him to his two nephews, and his library and collections to Fra Martini, an Augustinian monk.—Boccaccio wrote numerous works in Italian and Latin, and both in prose and poetry, few of which are referred to at the present day; his great fame rests upon the Decameron. The author's fondness for involving friars in every imaginable scene of mischief and ludicrous mishap created great scandal to the church, and his famous romance, the tenth novel of the sixth day, in which "Friar Onion promises some country people to show them a feather from the wing of the angel Gabriel, instead of which he finds only some coals, which he tells them are the same that roasted St. Lawrence," drew down the solemn anathema of the council of Trent. The editions of the Decameron are almost innumerable, and translations exist in all the languages of Europe. The earliest editions are extremely rare, and of that of Valdarfer in 1471 only one copy is known. This was purchased, not many years since, at the sale of the duke of Roxburghe's collection, by the marquis

of Blandford, for the enormous sum of £2,260. His works in the Italian language have been carefully collected and published in 17 vols. 8vo (Florence, 1827–'34). Boccaccio's *La Teseide* is written in the *ottava rima*, of which he is usually considered as the inventor, and is the first Italian poem which presents a specimen of the epopee. Chaucer borrowed from this poem his "Knight's Tale," and Shakespeare a part of his "Midsummer Night's Dream." The great English dramatist also availed himself of Boccaccio's *Decamerone* in "Cymbeline" and "All's Well that Ends Well."

BOCCAGE, or **Bocage, Manoel Maria Barbosa du,** a Portuguese poet of French descent, born at Setubal, Sept. 17, 1766, died in 1805 or 1806. He was expelled from the marines and banished to India for a sarcasm on the minister of the navy, and also driven from Macao for a similar offence against the governor general. A Goa merchant enabled him to return to Lisbon. In 1797 and 1798 he was arrested for sympathizing with French revolutionary ideas. He translated into Portuguese the *Colombiade* of his relative Mme. du Boccage, Le Sage's *Gil Blas*, Delille's poems, several of Ovid's *Metamorphoses*, and other works. His poems, being melodious and characteristic of popular feeling, though without depth of thought, were imitated by several poets who were called, after his assumed name of Elmano, the *Elmanistas*, and were the forerunners of the present national school of Portuguese poetry. A complete edition of his poems was published after his death (5 vols., Lisbon, 1806–'14).

BOCCAGE, Marie Anne Le Page, a French poetess, born in Rouen, Oct. 22, 1710, died Aug. 8, 1802. She married a literary man of the name of Fiquet du Boccage. At the age of 36 she wrote a poem which obtained the first prize from the Rouen academy. She afterward published a French "Paradise Lost" (Paris, 1748), an imitation of Gessner's "Death of Abel," an epic poem called *La Colombiade* (1756), a tragedy, and minor pieces. Her collected works ran through four editions and were translated into several languages. She also wrote letters of travel through England, Holland, and Italy.

BOCCANERA. I. Simone, a nobleman of Genoa, first doge of that republic, born about 1300, poisoned in 1363. Weary of the quarrels and violence of the great noble families, Guelphic and Ghibelline, the people in 1339 made Boccanera doge by acclamation. He carried on war successfully against the Turks, Tartars, and Moors; but the Guelphic nobles, suspending their mutual animosities, combined against him and laid siege to Genoa. Compelled to treat with them, Boccanera abdicated in 1344, and lived in exile in Pisa for 12 years, when he returned and freed Genoa from Milanese domination. He was anew made doge Nov. 14, 1356, and remained such for several years, until he was poisoned in Genoa at a banquet given to the king of Cyprus. **II. Gille,** a Genoese sailor, brother of the preceding, died in 1373. He distinguished himself as admiral of the Castilian fleet against the Moors under Alfonso XI., defeated the king of Morocco in two naval battles, participated in 1344 in the capture of Algeciras, and was made count of Palma. Under Henry II. of Castile he defeated the Portuguese fleet in 1371; and aided the French by achieving a brilliant victory over the English fleet sent for the relief of La Rochelle in 1372, capturing its admiral, the earl of Pembroke.

BOCCHERINI, Luigi, an Italian composer, born at Lucca, Jan. 14, 1740, died in Madrid in 1806. He wrote 93 quintets for two violins, viola, and two violoncellos, in which he commonly assigned the principal part to the first violoncello. His *Stabat Mater* is his only church composition.

BOCCONE, Paolo, afterward **Silvio,** a Sicilian naturalist, born at Palermo, April 24, 1633, died Dec. 22, 1704. He was a Cistercian monk, and to study natural history visited Italy, France, England, Germany, and many other countries. He left a great number of works, the most important of which is his *Icones et Descriptiones variarum Plantarum Siciliæ, Melitæ, Galliæ, et Italiæ* (4to, Lyons and Oxford, 1674).

BOCHART, Samuel, a French oriental and Biblical scholar, born in Rouen, May 30, 1599, died at Caen, May 16, 1667. He belonged to a Huguenot family, and became like his father and his uncle, the famous Pierre du Moulin, a Calvinistic minister. At 14 years of age he wrote freely in Greek verse, specimens of which were published by Dempster in the preface to his "Roman Antiquities" (1615). He studied philosophy at Sedan, and followed Cameron into England in the civil troubles of 1620. He next went to Leyden, where he studied Arabic. Returning to France, he was appointed pastor at Caen, and here in 1628 he held a public disputation with the Jesuit Véron, which was interrupted by Bochart's sickness, but was continued in epistolary essays for nearly three years, upon the principal topics of controversy between the Protestant and Roman Catholic churches. In 1646 he published his celebrated *Geographia Sacra*. Next followed his *Hierozoicon*, or treatise on the animals of the Bible; and he was collecting materials for similar treatises on the minerals and plants of the Bible, when he died while speaking at Caen.

BOCHNIA, a town of Austria, in Galicia, on the Uswica, a tributary of the Vistula, 21 m. E. S. E. of Cracow; pop. in 1870, 7,480. The town is chiefly built of wood, and it has celebrated salt mines, adjoining those of Wieliczka. They yield annually about 300,000 quintals of different kinds of salt, and have been worked since the 13th century. In the vicinity of the town are extensive quarries of gypsum.

BOCHOLT, a town of Prussia, in the province of Westphalia, on the Aa, 44 m. W. S. W. of Münster; pop. in 1871, 6,125. It has a castle belonging to the prince of Salm-Salm, and in the vicinity is a large iron mine.

BOCHSA, Robert Nicolas Charles, a harpist and composer, born at Montmédy, France, Aug. 8, 1789, died in Australia in June, 1856. When 7 years old he performed in public on the pianoforte, and at 12 had composed symphonies, concertos, overtures, and a quartet. At the age of 16 he began to study the harp, and was placed in the conservatoire at Paris, where he was instructed by Méhul in composition. At the end of the first year he obtained the principal prize in harmony. He soon acquired eminence as a performer on the harp, and his published compositions for it amount to 150, exclusive of 50 studies and two methods for pupils. In 1813 he was appointed by Napoleon first harpist at his private concerts; and he filled the same office under Louis XVIII. He composed a number of operas for the French stage, successful in their day, but now nearly forgotten. In 1817 he went to England, where his professional career lasted 30 years. In 1822 he became professor of the harp at the royal academy of music, of which institution he was also appointed a life governor. From 1847 he made musical tours in North America, Australia, &c., with Madame Anna Bishop.

BOCHUM, a town of Prussia, capital of an extensive and densely populated circle, in the district of Arnsberg, province of Westphalia, 40 m. S. W. of Münster; pop. in 1871, 21,193. It is situated in a fertile region on the coal field of the lower Ruhr, and contains a school of trades and a chamber of commerce. Bochum is the seat of the mineralogical administration of the county of Mark, and has important manufactories of cast iron, cast steel, and other articles. The production of coal and the trade in grain are considerable. The population has more than doubled since 1861, and is still rapidly increasing.

BOCK, Cornelius Peter, a German archæologist, born in Aix-la-Chapelle, June 8, 1804, died at Freiburg, Baden, Oct. 18, 1870. While studying at Bonn and Heidelberg he published poems under the name of Christodor, showing his devotion to the Roman Catholic creed. After spending several years in Italy he was for a short time professor at the university of Marburg, and subsequently resided for many years in Brussels. During about 11 years preceding his death he was honorary professor at Freiburg. He wrote chiefly on archæological subjects, and published in 1856 inedited fragments of Boëthius.

BOCK, Franz, a German theologian and archæologist, born at Burtscheid in 1823. He was educated at Bonn, became chaplain at Crefeld in 1850, then founded in 1852 the first large exhibition of ancient masterpieces of Christian art, and established a manufactory of silks after the models of the middle ages, for use in churches, and model schools for instruction in the manufacture of church vessels. He collected in various parts of Europe materials for his *Geschichte der liturgischen Gewänder des Mittelalters* (2 vols., Bonn, 1859), and was one of the founders of the episcopal museums at Cologne and Aix-la-Chapelle. He was appointed honorary canon of the cathedral of Aix-la-Chapelle, and has also been pastor at Cologne since 1857. He spent eight years in preparing his principal work, *Die Kleinodien des heiligen römischen Reichs deutscher Nation nebst den Kroninsignien Böhmens, Ungarns und der Lombardei*, with 58 chromo-lithographic plates (Vienna, 1864), and has published many other works relative to Christian art and antiquities.

BOCK. I. Karl August, a German anatomist, born in Magdeburg, March 25, 1782, died in Leipsic, Jan. 30, 1833. He was assistant prosector of Rosenmüller, and from 1814 till his death prosector in the anatomical theatre of Leipsic, and did much to improve that institution. He wrote *Handbuch der praktischen Anatomie des menschlichen Körpers* (2 vols., Meissen, 1819–'22), and other medical works. **II. Karl Ernst,** a German anatomist and author, son of the preceding, born in Leipsic, Feb. 21, 1809. He studied under the direction of his father at the schools and the university of Leipsic, graduating in 1831. In the same year he practised for a short time in the hospitals of Warsaw. On his return to Leipsic he became adjunct professor at the university, and subsequently professor and director of a part of the clinical department; and he also presided over post-mortem examinations. His *Handbuch der Anatomie des Menschen*, &c. (2 vols., Leipsic, 1838; 4th ed., 1864), and *Anatomisches Taschenbuch* (1839; 5th ed., 1864), have been translated into Russian and Danish, and his *Lehrbuch der pathologischen Anatomie und Diagnostik* (4th ed., 1864) is very popular. His other works include *Handatlas der Anatomie des Menschen* (5th ed., 1864) and *Bau, Leben und Pflege des menschlichen Körpers in Wort und Bild* (1868); and he completed the *Chirurgisch-anatomische Tafeln* of his father.

BOCKENHEIM, a town of Germany, in the Prussian province of Hesse-Nassau, about 1 m. N. W. of Frankfort, on the Main and Weser railway; pop. in 1871, 8,476. It has many manufactories, and its population is increasing.

BOCKELSON, or Boccold, Johann. See JOHN OF LEYDEN.

BÖCKH, August, a German philologist and antiquary, born at Carlsruhe, Nov. 24, 1785, died in Berlin, Aug. 3, 1867. He was the son of a functionary and the brother of Friedrich von Böckh (1777–1855), who was for a time prime minister of Baden. He prepared himself at the gymnasium of Carlsruhe for a course of theological studies at Halle, when Wolf directed his attention to philology, to which science he continued to apply himself at Berlin. He was professor at Heidelberg from 1807 to 1809, and afterward, for over 40 years, of rhetoric and ancient literature in the university of Berlin. He was made member of the academy in 1814 and privy councillor in 1830. He opened a new era in philology and archæology, by abandoning the old system of mere linguistic research,

and extending his inquiries to all material, mental, social, religious, and general vestiges and aspects of civilization. His conception of philology as an organically constructed whole excited considerable opposition, but led to a more exhaustive study of classical history and civilization; and he trained many renowned scholars, including Karl Otfried Müller. His remarkable knowledge of classical poetry is revealed in his *Græcæ Tragœdiæ Principum, Æschyli, Sophoclis, Euripidis* (Heidelberg, 1808), and especially in his edition of Pindar (2 vols., Leipsic, 1811–'22). The greatest monument of his genius for minute investigation of political, economical, and social conditions is his *Die Staatshaushaltung der Athener* (2 vols., Berlin, 1817; enlarged edition, 1851), which was followed by related works entitled *Metrologische Untersuchungen über Gewichte, Münzfusse und Masse des Alterthums* (1838), and *Urkunden über das Seewesen des attischen Staats* (1840). Of the first named work, an English translation was made by Sir G. C. Lewis ("The Public Economy of Athens," London, 1828), and one of the second edition by Anthony Lamb (Boston and London, 1857). Under the auspices of the academy of sciences he published the *Corpus Inscriptionum Græcarum* (4 vols., Berlin, 1824–'62; since continued by his pupil Franz and afterward by Kirchhoff), designed to contain every known Greek printed and MS. inscription. He also presided over the academical committee appointed for the supervision of a new edition of the works of Frederick the Great. His later publications include *Epigraphisch-chronologische Studien* (Leipsic, 1856); his lectures and public orations, edited by Ascherson (2 vols., 1856–'9); and *Ueber die vierjährigen Sonnenkreise der Alten* (Berlin, 1863). His *Gesammelte kleinere Schriften* have been published in 6 vols. (1858–'72), and a biography of Böckh is in preparation (1873) by Prof. Stark.

BÖCKING, Eduard, a German jurist, born at Trarbach, May 20, 1802, died in Bonn, May 3, 1870. He studied at Heidelberg, Bonn, Berlin, and Göttingen, and was for 40 years the principal teacher of Roman law at the university of Bonn. Besides annotated editions of the fragments of Ulpian, the Institutes of Gaius, and other classical authorities on ancient law, he published *Pandekten des römischen Privatrechts* (2 vols., Bonn and Leipsic, 1843–'55); *Der Grundriss der Pandekten* (5th ed., Bonn, 1861); *Römisches Privatrecht, Institutionen des römischen Civilrechts* (2d ed., Bonn, 1862); and, after many years' preparatory labors, the highly esteemed *Notitia Dignitatum utriusque Imperii* (3 vols., Bonn, 1839–'50). He also published an edition of A. W. von Schlegel's works in 18 vols., and collected Ulrich von Hutten's Latin writings, with a bibliographical index, in 7 vols.

BÖCKLIN, Arnold, a Swiss painter, born in Basel in 1827. He studied in Düsseldorf, Paris, and Rome, was professor of landscape painting at the Weimar academy in 1860–'62, and has since resided in Rome. His principal works, remarkable for their powerful though ideal delineation of scenery, are in Munich, Berlin, and Basel. Among them are "Pan," "Amazons Hunting in the Forest," and "A Panic."

BOCKSBERGER, or **Bocksperger, Hans** or **Hieronymus,** a German painter, born in Salzburg in 1540, died at the end of the 16th or early in the 17th century. He excelled in battles and hunting scenes, illustrated in the ducal palace of Augsburg the history of Frederick Barbarossa, and in 1579 executed frescoes in the castle of Trausnitz, which are still pointed out, together with his portraits of court jesters.

BODE, Johann Elert, a German astronomer, born in Hamburg, Jan. 19, 1747, died in Berlin, Nov. 23, 1826. While a boy he made a telescope for himself, and converted his father's garret into an observatory. He published in early life a paper on a solar eclipse, and a popular introduction to astronomy. In 1772 he was chosen astronomer to the Berlin academy of sciences. His "Astronomical Almanac" (*Astronomische Jahrbücher*), of which 54 volumes appeared at Berlin from 1776 to 1829, was continued by Encke. His *Uranographia* contains observations on 17,240 stars, 12,000 more than were contained in any previous chart.—The name of Bode's law has been given to a symmetrical relation or progression in the distances of the planets from the sun. To 4 add 3 multiplied by 2 once, twice, thrice, &c., and the sums multiplied by 9,500,000 will give the distances of the successive planets from the sun. The progression is merely that of the numbers 4, 4+3, 4+6, 4+12, &c. This rule fails in the case of Neptune, the interval between its orbit and that of Mercury being but little more than one half larger than that between Uranus and Mercury. A similar progression is observed in the distances of the satellites of Jupiter and Saturn from those planets. The merit of discovering this law is not wholly Bode's. It is a modification of one previously announced by Kepler.

BODENSTEDT, Friedrich Martin, a German author born at Peine in Hanover, April 22, 1819. He studied at Göttingen, Munich, and Berlin, and in 1840 became private tutor at Moscow, in the family of Prince Galitzin. While in this position, which he retained until 1844, he published two volumes of poetry. He was next for a short time at Tiflis in charge of a school and professor in the gymnasium, and in 1845 set out upon travels through the Crimea, the Caucasus, Asia Minor, and Greece. The result of his observations was published in *Völker des Kaukasus* (2 vols., Frankfort, 1848, 1855) and *Tausend und ein Tag im Orient* (2 vols., Berlin, 1850; 4th ed., 1864). These two works were the foundation of his reputation. He was afterward engaged for several years in journalism, and in 1854 took up his residence at Munich and lectured as professor in the university, at first upon the Slavic languages and literatures, and from 1858

upon the old English literature. He has translated from the Russian the poems of Lermontoff (2 vols.) and Pushkin (3 vols.), and from the English Shakespeare's sonnets (1862), and written *Shakspeare's Zeitgenossen und ihre Werke* (3 vols., Berlin, 1858–'60). The most brilliant of his original compositions was the *Lieder des Mirza Schaffy* (Berlin, 1851; 30th ed., 1870). These songs were long erroneously supposed to be translations from the Persian, and have been rendered into almost all the languages of Europe. Among his other publications are *Demetrius* (1856), *Gedichte* (3d ed., Berlin, 1859), *Epische Dichtungen* (1862), and *König Authari's Brautfahrt* (1860). The last two are dramas. He is now (1873) engaged with others in making a complete translation of Shakespeare.

BODICHON. I. Eugène, a French physician, born at Nantes about 1810. He received his diploma in Paris in 1835, and has since practised his profession in Algiers, and published several works, including *Étude sur l'Algérie et l'Afrique* (Paris and Algiers, 1847). **II. Barbara Leigh,** wife of the preceding, born in England, April 8, 1827. She is the eldest daughter of the late Mr. Benjamin Smith, who was member of parliament for Norwich. She promoted reforms in the English laws of marriage and divorce, established a school in London for daughters of respectable artisans, and in 1857 married Dr. Bodichon, whom she aided in some of his works. She has also successfully devoted herself to landscape painting.

BODIN, Jean, a French publicist, born at Angers in 1530, died at Laon in 1596. After studying law at Toulouse, he repaired to Paris, and devoted himself to politics. His first work was a *Methodus ad facilem Historiarum Cognitionem* (Paris, 1566). In 1576 he published his *Six livres de la république*, which gained for him a great reputation, and the esteem of Henry III.; but having suffered in the king's mind by the calumnies of some courtiers, he transferred his services to the duke of Alençon, then the chief of the party called *les politiques*, and went with that prince to England in 1580. His *Démonomanie, ou traité des sorciers*, was printed at Paris in 1580. After the death of his protector, in 1584, he retired to Laon, where he married, and held the office of *procureur*. He was subsequently sent as deputy for the *tiers état* of Vermandois to the states general at Blois, where he supported several democratic measures. On the death of Henry III. Bodin joined the party of the league, but a little later went over to the side of Henry IV. He died of the plague. His biography has been written by Baudrillart (Paris, 1853).

BODLEIAN LIBRARY, the public library of the university of Oxford, so called from Sir Thomas Bodley, who restored it toward the close of the 16th century, many of the previous collections of books and MSS. having been destroyed during the reign of Edward VI. Besides restoring the building and providing a fund of £2,000 for the purchase of books, he also presented a collection which he had made on the continent valued at £10,000, and left an estate for the maintenance of officers and for keeping the library in repair. For the government of the library he drew up statutes, which were afterward incorporated with those of the university. The library was first opened to the public Nov. 8, 1602. The example of Bodley was soon followed by the earl of Essex, who presented part of the library of the Portuguese bishop Osorius, which had been captured by him in 1596, shortly after the expedition against Cadiz. After the death of Bodley, the earl of Pembroke added a valuable collection of Greek MSS., procured by Baroccio, a Venetian. At later dates Sir Thomas Roe, Sir Kenelm Digby, Selden, Gough the antiquary, and Archbishop Laud made donations of valuable Greek, oriental, and German MSS. The rabbinical collections of the Hebrew scholar Oppenheim, a great collection of eastern MSS., of early editions of the Bible, original editions of ancient and classic authors, together with 50,000 dissertations by members of foreign universities, and an extensive collection of medals, coins, prints, &c., were also subsequently deposited in this library. In 1809 the traveller Clarke gave to it some rare Greek and Latin MSS.,

The Bodleian Library.

including a Plato from the isle of Patmos. In 1818 an exceedingly valuable collection of Hebrew, Greek, and Arabic MSS., procured from Venice, was added, together with a portion of the famed library of Richard Heber (1834); and lastly, the rare books, MSS., and coins of Francis Douce. The library is constantly increasing by donations, by copies of every work printed in the United Kingdom, to which it is entitled by the copyright law, as well as the books purchased from the fund left by Bodley, by fees received at matriculation, and by an annual payment of all persons (servitors excepted) who have the right of admission to the library. The library now contains about 300,000 printed volumes.

BODLEY, Sir **Thomas,** the founder of the Bodleian library, born in Exeter, March 2, 1544, died in Oxford, Jan. 28, 1612. At the age of 12 he went to Geneva with his father, and studied the ancient languages and divinity at the then newly founded university of that city. On the accession of Queen Elizabeth in 1558 he returned to England, entered the university of Oxford, became fellow of Merton college in 1564, and filled various offices in the university till 1576, when he commenced four years' foreign travel, After his return he was made gentleman usher to Queen Elizabeth, and in 1585 forfeited his fellowship by marriage. Queen Elizabeth employed him after this in various embassies—to Denmark, Brunswick, Hesse, France, and the Hague. At the Hague, where he was admitted one of the council of state, he remained five years, but was again sent thither, not finally quitting Holland till 1597. From this time he abandoned the public service, and set about restoring the public library at Oxford. He was knighted on the accession of James I. His autobiography was published at Oxford in 1647.

BODMER, Georg, a Swiss mechanic, born at Zürich in December, 1786, died in June, 1864. Being apprenticed to a mechanic in Thurgau, he invented screw or cross wheels in 1803, and made important improvements in the machinery for wool-spinning in 1805. He established himself at Küssnacht, where in 1808 he invented a cannon for firing bombs which exploded when they struck. He settled in 1809 at St. Blasien in Baden, where he devoted himself to the manufacture and improvement of firearms and industrial machinery. In 1824 he went to Manchester, England, where he applied many of his mechanical improvements. He constructed at Bolton an immense water wheel 61 feet in diameter, perfected locomotives, and during 20 years received more than 80 patents for machinery. In 1847 he established himself in Austria and engaged in building railroads.

BODMER, Johann Jakob, a German scholar and literary reformer, born at Greiffensee, Switzerland, July 9, 1698, died in Zürich, Jan. 2, 1783. In union with some other literary young men, he issued in 1721 a periodical entitled *Diskurse der Maler*, in which many German poets were severely criticised for their servility to French models. He formed a German literary school based on national and ancient standards, in opposition to the French school of Gottsched, with whom he carried on a protracted contest. He wrote poems and dramas, translated "Paradise Lost" and the "Dunciad," and published valuable editions of older German poets. He was for 50 years professor of history at Zürich.

BODMIN, the county town of Cornwall, England, 26 m. W. N. W. of Plymouth; pop. of the municipal and parliamentary borough in 1871, 6,956. The town is built partly in a valley and partly on a hillside, and the streets are well paved and lighted with gas. The principal church, rebuilt in 1472, has a massive tower. Adjoining the town are a race course and the ruins of the hospital of St. Lawrence. A great fair for sheep and cattle, which was among the privileges granted to the hospital by Elizabeth, is still held here annually; and there are several other fairs for cattle and horses. The commerce in wool is considerable. The origin of Bodmin (Cornish, *Bosvenna* or *Bosuenna*, "the houses on the hill," also called Bosmana and Bodminian, "the abode of the monks") is associated with St. Petroc, who lived here and died in 564. His hermitage was occupied by Benedictine monks till 936, when King Athelstan founded a priory near its site. Some portions of the priory still remain, and are used for secular purposes. In 981 the town was sacked by the Danes. In 1497 Perkin Warbeck gathered here armed bands against Exeter. During the civil war it was taken by Fairfax in 1646.

BODONI, Giambattista, an Italian printer, born at Saluzzo, Feb. 16, 1740, died in Padua, Nov. 20, 1813. He learned the trade of printer with his father, and practised drawing and engraving upon wood. At the age of 18 he was employed as a compositor in the printing office of the propaganda at Rome, and there learned Hebrew and Arabic, and engraved punches for a new set of oriental types. In 1768 he took charge of the ducal printing establishment at Parma, and engraved a new series of Greek types, in imitation of those employed by the Italian printers of the 15th century. To these alphabets he soon added others, and in 1775 printed the *Epithalamia Exoticis Linguis reddita*, a folio of 500 pages containing the alphabets of 100 languages, nine of which now appeared for the first time. In 1789 he printed the first edition of his *Manuale tipografico*, in folio, which contained descriptions of 100 cities, each printed in a different kind of type, and also specimens of Greek type, of which he then had 28 kinds, a number afterward increased to 45. An enlarged edition, partly prepared before his death, and continued by Luigi Orsi, appeared in 1818, in two large folio volumes, containing specimens of more than 250 alphabets, and is esteemed the most mag-

nificent work of the kind. The Bodonian foundery and printing office came to be the finest in Europe, furnishing type to prominent printers in all countries. Bodoni gained a considerable fortune and bought a fine estate, and his name was inscribed in the "golden book" of the nobility; but he continued to exercise his profession to the last. In 1806 he commenced the printing of a superb edition of the Iliad, which appeared in 1808, in 3 vols. folio. The Bodonian editions of Greek, Latin, Italian, and French classics are notable rather for beauty than accuracy. Lama published his biography and a catalogue of his editions (2 vols. fol., Parma, 1816).

BOEHM, Böhm, or **Boehme, Jakob** (often called by English writers Jacob Behmen), a German mystic, born at Altseidenberg, near Görlitz, in Silesia, in 1575, died at Görlitz, Nov. 27, 1624. The son of a peasant, his education was very deficient. He was apprenticed to a shoemaker, travelled for many years as a journeyman, and by unceasing efforts made himself familiar with the current theological literature. Having returned from his travels, he set up a shoemaker's shop at Görlitz in 1594, and married the daughter of a butcher. He was subject to hallucinations, during which he imagined that he conversed with God, and obtained knowledge of nature and grace, which he considered it necessary he should make known to his fellow men. Accordingly, in 1612 he published his first book, *Aurora, oder die Morgenröthe im Aufgang*, in which he proposed "to light a torch for all who are longing for truth." This book, which contains very deep and obscure philosophical sentiments on God, nature, and mankind, couched in crude figurative language, was violently denounced. In 1619 he published other writings, among which were *Beschreibung der drei Principien göttlichen Wesens* and *Von wahrer Busse und wahrer Gelassenheit*. The consequence was his banishment from the city. He went to Dresden, where he defended his opinions in a public discussion with eminent theologians. He next went to Silesia, and obtained the abrogation of the decree of banishment just in time to return home and die. His theological adversaries refused to allow his remains a Christian burial, but were compelled to do so by the civil authorities.—Boehm's writings, notwithstanding their obscurity, found many admirers, not only in Germany, but in England, where a religious sect was built upon them. In 1697 Jane Leade, an enthusiastic admirer of Boehm, founded a society for the true interpretation of his works (Philadelphists). John Pordage was the profoundest expounder of Boehm. A new edition of Boehm's works was published by Schiebler (Leipsic, 1831–'46). The best English translation of them is that of William Law (2 vols. 4to, London, 1764).

BŒOTIA (Gr. Βοιωτία), a division of ancient Greece, bounded N. by Phocis and Opuntian Locris, E. by the Eubœan sea, S. by Attica and Megaris, and W. by the Corinthian gulf and Phocis. The mountain ranges of Cithæron and Parnes in the south, Helicon in the west, Parnassus on the northwest, and the Opuntian range on the north and east, make one large basin, which includes the whole of Bœotia with the exception of a small coast district on the Crissæan sea. This large basin is divided by the mountains Ptoum and Phœnicium, which reach from the Eubœan sea to Mt. Helicon, into the northern basin of Lake Copais (now Topolias), into which flows the river Cephissus (Mavronero), and a basin which comprises the plain of Thebes and the valley of the Asopus (Oropo). Lake Copais, 47 miles in circumference, is formed by the overflowing waters of the Cephissus, which coming from Phocis enters Bœotia from the north at Chæronea, and is prevented by the mountains on the coast from flowing directly into the Eubœan sea. It with difficulty finds its outlets through underground channels, called in modern Greek καταβόθρα, in the limestone formation of those mountains. In summer the lake is nearly dry and is little more than a marsh, but the whole district is subject to inundations. The Minyæ of Orchomenus, the ancient inhabitants of this region, constructed two tunnels or underground channels to the sea for the surplus waters of the lake. One of these, leading from the N. E. part of the lake toward upper Larymna, was nearly four miles in length, and penetrated at intervals by vertical shafts from 100 to 150 feet in depth. The other was shorter, and connected Lake Copais with Lake Hylica toward the east. Nearly all Bœotia has a fertile soil, but the lake district in the north is especially productive, and celebrated both in ancient and modern times for its abundant crops of corn. The climate of the country, however, is more severe than that of the rest of Greece. The leading city of Bœotia was Thebes; the other principal towns were Platæa, Orchomenus, Chæronea, Coronea, Lebadea, Thespiæ, Haliartus, Tanagra, and Aulis.—Bœotia was the scene of many of the legends upon which were founded the plays of the Greek tragedians. It was originally inhabited by various barbarous tribes, of which the two most powerful were the Minyæ of Orchomenus and the Cadmeans of Thebes. About 60 years after the Trojan war, according to Thucydides, the supremacy of these two tribes was overthrown, and the latter expelled from their city by the Bœotians, an Æolian people who immigrated from Thessaly. Early in the historic age the country was governed by a confederacy of the fourteen most important cities under the presidency of Thebes, and in all these cities the Bœotian was the prevailing race. The chief magistrates of the confederacy were called Bœotarchs, and were elected annually. Most of the cities were ruled by oligarchies, which were naturally hostile to the democratic state of Attica. In 507 B. C. the Bœotians, with the Peloponnesians and Chalcidians, made war on Athens, and in the

Persian wars they sided for the most part with the Persians. Platæa, however, was democratic in its government, and a faithful ally of Athens. (See PLATÆA.) During the Peloponnesian war the Bœotians were allies of Sparta and assisted in the overthrow of Athens. In 395 B. C., however, they joined the league against Sparta, which was overcome in the following year by Agesilaus at Coronea. In 382 another war between Bœotia and Sparta began, in which the Theban Epaminondas gained the battles of Leuctra and Mantinea, and broke the power of Sparta. At this time Bœotia was the leading state and Thebes the ruling city of Greece. This supremacy was taken away by the Macedonians under Philip at Chæronea in 338, and three years later Thebes was razed to the ground by Alexander, but was restored by Cassander and the Athenians in 316. (See THEBES.) From this epoch dates the utter decline of Bœotia, which was finally ruined by the rapacity of Sylla, who defeated at Chæronea the army of Mithridates. Insignificant under the Romans, during the middle ages, and under the Turks, it became the scene of some of the sharpest fighting in the war of Greek liberation.—In the present kingdom of Greece, it forms two eparchies, Thebes and Livadia, in the nomarchy of Attica and Bœotia. (See ATTICA.) Bœotia is still famous for its heavy atmosphere, to which the Athenians attributed the proverbial dulness of its people.

BOERHAAVE, Hermann, a Dutch physician, born at Voorhout, near Leyden, Dec. 31, 1668, died in Leyden, Sept. 23, 1738. His father was a clergyman, and he was destined for the same calling. He studied at Leyden under Gronovius, Ryckius, and Trigland, and obtained the highest academical honors. In 1689 he received his degree in philosophy, the subject of his thesis being the distinction between mind and matter, in which he condemned the doctrines of Epicurus, Hobbes, and Spinoza, and maintained that the doctrines of Epicurus had been completely analyzed and refuted by Cicero. For this dissertation a gold medal was given to him by the city. After the death of his father Boerhaave supported himself for a while by teaching mathematics, and then engaged in the study of medicine. In 1693 he obtained his degree of doctor of medicine at Harderwyck, and immediately entered on the duties of his profession. In 1701 he was appointed by the university of Leyden to supply the place of Drelincourt as lecturer on the institutes of medicine. His inaugural discourse was entitled *De commendando Hippocratis Studio*, in which he recommended to his pupils the study of the works of that writer as the best source of instruction. He was fond of chemistry, botany, and mathematics, and these sciences were much consulted in his medical investigations. In 1708 he published at Leyden the *Institutiones Medicæ in Usus Annuæ Exercitationis Domesticos*, a comprehensive work on the study and practice of medicine, the functions of the body, health, disease, and the means of prolonging life. The next year appeared his *Aphorismi de Cognoscendis et Curandis Morbis*, a classification of diseases, with explanations of their causes, symptoms, and treatment. These two works, which show immense learning and are models of style, passed through numerous editions, were copiously annotated, and translated into many languages. In 1709 he was appointed successor to Hotton in the chair of botany and medicine. Under his influence additions were made to the botanical garden of Leyden, and he published numerous works descriptive of new species of plants. In 1714 he was appointed rector of the university, and in the same year succeeded Bidloo in the chair of practical medicine. In this position he had the merit of reviving the ancient system of clinical instruction. In 1718 he was appointed to the chair of chemistry, and the fruit of his labors in this position appeared some years later in his *Elementa Chemiæ* (best ed., 4to, Leyden, 1732). In 1729 declining health induced him to resign the chairs of chemistry and botany, and in 1731 he resigned the rectorship of the university, delivering a discourse *De Honore Medici Servitute*. Besides attending to his active duties as rector of the university and professor of chemistry, botany, and medicine, Boerhaave was always much consulted as a practical physician. He was simple and economical in his habits, and when he died he left a fortune of 2,000,000 florins to his only surviving daughter.—The genius of Boerhaave attracted students to the university of Leyden from all parts of Europe; and when Peter the Great revisited Holland in 1716, he had recourse to him for instruction. From the time of Hippocrates, no physician had excited so much admiration as Boerhaave. His personal appearance was simple and venerable; to uncommon intellectual powers he united gentleness, benevolence, and amiable manners. In lecturing, his style was eloquent and graceful, his ideas clear, and his delivery perfect. He possessed an excellent memory, and was an accomplished linguist and fond of music. He was of a religious turn of mind, and usually devoted an hour early in the morning to reading the Scriptures and pious meditations, to which habit he attributed his faculty of enduring with cheerfulness his immense labors. The city of Leyden raised a monument to his memory in the church of St. Peter, inscribed "To the health-giving skill of Boerhaave" (*Salutifero Boerhaavii genio sacrum*), and on which was engraved his motto, *Simplex sigillum veri*.

BOERS (Dutch, *boer*, a peasant), the Dutch colonists of southern Africa. The first Dutch settlements there were established in the beginning of the 17th century, and grew rapidly while the Netherlands were a ruling maritime power; but during the 18th century the adventurous spirit of the Dutch died away, and as the influx of fresh elements from Europe diminished, the original settlers of Cape Colony

developed a peculiar character of their own, singularly blending the steadiness and deliberation of the Dutch with recklessness and energy. The Boers could never be reconciled to the transfer of the colony to Great Britain in 1814, and maintained a secret but constant opposition against all efforts to Anglicize the colony. The lenient policy which the British adopted toward the Caffres, and finally the emancipation of the negro slaves (1833), which threatened to overthrow the entire domestic system of the Boers, and the retrocession by government of the neutral eastern frontier district to the Caffres in 1835, determined them to emigrate and to establish in the interior an independent community. As early as 1835 the first bands, led by Triechard of Albany, crossed the Orange river, and settled, one part near the Zoutpansberg (Salt-pan mountain) and another part, led by Orich, near Delagoa bay, where they were soon destroyed by malignant coast fevers. A third band, which followed in August, 1835, was attacked by the Matabelee Caffres, and obliged to fall back on the Modder river. Having been reënforced by other emigrants, they again advanced under the leadership of Gerrit Maritz, repulsed the Matabelees, Jan. 17, 1836, and finally settled in the Orange river district, where they organized a patriarchal commonwealth under Pieter Retief. Meanwhile a small British colony had been established at Port Natal by Capt. Gardner, who abandoned it as hopeless in 1836. The remaining colonists called on the Boers to unite with them, and in 1837 Retief with his followers crossed the Quathlamba mountain; but at an interview with the chief of the Zooloo Caffres he and his companions were treacherously slain. The remnant of his followers turned in a southerly direction, founded the settlement of Pieter-Maritzburg, and under the lead of Pretorius defeated the Zooloos, Feb. 1, 1838. In 1840 Gov. Napier by proclamation denied their right to form an independent community, even beyond the boundaries of the British possessions. In 1842 a small British force was landed, which compelled the Boers to retire from the coast and to accept the amnesty offered them in exchange for their recognizing the British sovereignty. Many of them, unwilling to submit, recrossed the mountains and settled in the Vaal region. The British, having possession of Natal, at once began to disturb the traditionary rights of the Boers. The consequence was, that again a large portion of them migrated northward beyond the Klipp river, then the northern boundary of Natal, where for three years, unprotected by the government, they struggled against the Zooloos. When at length, in 1845, they had overcome the resistance of the Caffres by their unaided efforts, the colonial government immediately proclaimed the Buffalo river as the northern boundary of Natal, thus once more subjecting the Boers to British rule. After some resistance the Boers determined to emigrate to the Vaal country. Smith, the governor general, attempted to retain them by promising full redress of their grievances, but it was too late. Similar events followed beyond the Quathlamba. The bands, led by Pretorius, had settled in the vicinity of the Griquas and Bechuanas; but on Feb. 3, 1848, the colonial government annexed by proclamation the Orange river sovereignty to the Cape Colony, under the pretext of protecting the savage Griquas against encroachments on their territory. The Boers took to arms, and on June 17 Pretorius drove the British garrison from Bloemfontein. But Gov. Smith crossed the Orange river with a large force, and on Aug. 29 defeated the Boers near Boomplaats, after a long and obstinate resistance. Pretorius and the majority of his followers, unwilling to submit to the British, migrated to the north, beyond the Vaal river, and there founded the Transvaal Republic. Some 12,000 Boers remained in the Orange river country, but, although subdued by force, they preserved their hostile feeling against their conquerors. The attempt to introduce convicts into the colony was so energetically resisted that the government was obliged to desist. The Caffre wars, begun in 1850, made it evident that united action by the Europeans was necessary for safety, and in 1853 the relinquishment of the Orange river country to the Boers was resolved upon by the government. On Feb. 23, 1854, this act was consummated, and the Orange River Republic was recognized as an independent state by England, since which time the two republics of Orange River and Transvaal have rapidly gained strength and power.

—The Orange River Republic, or Orange Free State, is bounded S. by the Orange river, W. and N. by the Vaal river, E. by the Basuto territory and the Quathlamba or Drakenberg mountains, and extends from lat. 27° to 31° S.; area, 48,049 sq. m.; pop. 50,000, of whom 15,000 are white. The country is a high table land, its average elevation above the level of the ocean being about 5,000 feet, excellent for grazing purposes, and abundantly watered. The Boers, being principally cattle breeders, have not developed the agricultural resources of the country to any considerable extent. Coal and iron have been found in many places, and gold was discovered in 1854 on the Caledon river. The climate is dry, temperate, and salubrious. Excellent roads communicate with Cape Colony and Port Natal. The republic is divided into five districts, viz., Fauresmith, Caledon or Smithfield, Bloemfontein, Winburg, and Harrysmith or Vaal River district. The principal towns are Bloemfontein, the seat of government; Smithfield, on the Orange river; Winburg, the former capital; and Harrysmith, the key of the Port Natal road, and the centre of the principal agricultural district. The political organization is democratic. An elective president is the chief magistrate, but the congress (*volksrad*) has all legislative powers. On the same principle the districts are governed by *landdrosts* (govern-

ors) and *heemraden*. In May, 1870, diamonds were found on the banks of the Vaal river, near the missionary station of Pniel in the district of Winburg, and also north of the river in territory claimed by the Transvaal Republic. A large population was at once attracted to these diamond fields, and although the region was claimed by both republics, the miners organized a government of their own. Their principal settlement is Du Toit's Pan, said to contain in 1872 a population of 16,000. By a proclamation promulgated in Capetown in October, 1871, the British government annexed the diamond fields to Cape Colony, in spite of the protest of the Free State authorities. The territory was divided into the districts of Klipdrift, Pniel, and Griqua Town.—The Transvaal Republic, between lat. 22° 30′ and 28° S., is bounded E. by the Quathlamba mountains, S. by the Vaal river, W. by the Hart river, and N. W. and N. by the Limpopo river; area, 77,964 sq. m.; pop. 140,000. The physiognomy of the country is nearly the same, viz., an elevated table land, intersected by parallel mountain ranges in the east. The soil, consisting of sand, clay, and loam, is more fertile than that of the Orange river country. Its rolling prairies are covered with excellent tall grass, interspersed with shrubs and magnificent trees. In the mountainous region there are primeval forests. The climate is similar to that of southern Europe, and all European and many tropical vegetables are raised without difficulty. The rivers, of which the country has a good number, are not navigable, and communication with the seashore is difficult. Grasshoppers are a constant plague to the farmer, while flies and other venomous insects often destroy hundreds of cattle. The form of government is a pure democracy. A *volksrad*, elected by ballot (every white man of 21 years being entitled to vote), meets four times every year at different places. This body unites all legislative and executive powers. It appoints for each district or church parish military and civil officers, viz., commanders-in-chief, commanders, field cornets (colonels, majors, and captains), *landdrosts*, and *heemraden*. The landdrosts have administrative as well as judicial powers; they and their messengers are the only salaried officers. Every white man is entitled to a homestead of 3,000 acres from the public lands. Slavery, properly speaking, has no legal existence, but the Boers keep a number of semi-civilized Hottentots as laborers and herdsmen. The principal settlements are Potchefstrom, containing 1,500 inhabitants, Rustenburg, Orichstadt, and Zoutpansberg. These towns are laid out very regularly, and are well supplied with water.—The Boers are represented by those who have sojourned among them as plain, honest, straightforward, pious, and hospitable, but distrustful of foreigners, especially Englishmen. They live in the most patriarchal way on their *plaats* or cattle farms, in comfortable and spacious, though unpretending dwellings. Besides cattle breeding, their favorite occupation is hunting. Inns are unknown, and no Boer ever denies hospitality to a stranger.

BOËTHIUS, Anicius Manlius Torquatus Severinus, a Roman philosopher, born between A. D. 470 and 475, executed at Pavia about 525. His grandfather Flavius, prefect of the prætorians, was murdered by order of Valentinian III., in 455. His father was consul in 487, but died while the son was yet a child, and Boëthius was brought up by some of the principal men in Rome, among whom were Festus and Symmachus. He attained the rank of patrician while under the legal age, was consul in 510, and subsequently *princeps senatus*. In the mean time he had married Rusticiana, the daughter of his guardian Symmachus, who bore him two sons, Aurelius Anicius Symmachus and Anicius Manlius Severinus, both of whom were afterward consuls. Amid his public duties he found leisure to translate several mathematical and philosophical works from the Greek, to indulge his talent for the construction of curious machines, and to bestow charity upon the poor of Rome. His reputation attracted the attention of Theodoric, king of the Ostrogoths, who appointed him *magister officiorum* at his court. For some years Boëthius enjoyed the friendship of this monarch, and on the occasion of the inauguration of his two sons in the consulate in 522, he pronounced a glowing panegyric on his patron. His bold advocacy of the cause of the weak had raised him up many enemies at the court of Theodoric, who eagerly watched for an opportunity to effect his ruin. At length Albinus, a noble Roman, having been accused of treason by the dictator Cyprianus, Boëthius undertook his defence with such zeal that he was accused of plotting with Symmachus to free Rome from the barbarians. He was accordingly by command of Theodoric arrested with Symmachus, and, without being allowed to defend themselves, they were stripped of their property and sentenced to death. Boëthius was taken to Pavia, imprisoned for some time in the baptistery, and executed. In 722 a cenotaph was erected in his honor, in the church of San Pietro Cielo d'Oro, by Liutprand, king of the Lombards; and in 990 a still more magnificent one, with an epitaph by Pope Sylvester II., was raised to his memory by the emperor Otho III. He was long regarded as a saint and a martyr, and in after times many traditions were current about his intimacy with St. Benedict, and the miracles which he had wrought during his life and at his death. It is, however, now considered an established fact that he was not a Christian at all, and that the theological compilations ascribed to him were written by another person of the same name. The greatest of his works is that which he composed in prison at Pavia while awaiting execution, and entitled *De Consolatione Philosophiæ*. It is an imaginary dialogue, alternately in prose and verse, between the author

and philosophy. Its tone is moral and elevated, its style eloquent, perspicuous, and pure, and its arguments are ingenious. It had great fame in the middle ages, and was translated into all the languages of central and western Europe, and also into Greek, Hebrew, and Arabic. The most celebrated of these translations was that into Anglo-Saxon by King Alfred (new ed. by Fox, London, 1864), which has a peculiar interest, both as being one of the earliest specimens of English literature and one of the chief literary relics of Alfred. Editions of the works of Boëthius were published at Venice in 1491 (the earliest full collection), at Basel in folio in 1570, and at Glasgow in 4to in 1751. There is an edition of *De Consolatione Philosophiæ*, with notes and English translation by J. S. Cardale (London, 1829).

BOËTHIUS, or **Boece, Hector,** a Scottish historian, born at Dundee about 1465, died about 1535. He was educated at Dundee and at Paris, where in 1497 he was appointed professor of philosophy in the college of Montaigu, and formed an acquaintance with Erasmus, who afterward dedicated to him a catalogue of his works. In 1500 he was called by Bishop Elphinstone to the first presidency of Aberdeen college, and was made canon of the cathedral and chaplain of the chantry of St. Ninian. His two most important works were a biography of the bishops of Aberdeen (Paris, 1522), and his "History of Scotland" (*Scotorum Historiæ a prima Gentis Origine*, 1526). The latter work contains much that is fabulous, and its author has been charged with plagiarism and with inventing materials and imagining authors for them. It was translated into English by John Bellenden in 1536 (new edition, 2 vols. 4to, Edinburgh, 1821).

BOÉTIE, Étienne de la, a French author, born at Sarlat, Nov. 1, 1530, died Aug. 18, 1563. He was celebrated in childhood for his translations, and became a prominent counsellor of the parliament of Bordeaux, but is now chiefly remembered because Montaigne published some of his works, and recorded in a few touching pages the friendship which existed between them. His discourse on voluntary servitude, a violent philippic against royalty, was written in his 18th year. He died in the arms of Montaigne.

BOG, an Irish word, literally meaning soft, applied in Great Britain to extensive districts of marshy land. In Europe these tracts consist so generally of peat, that this substance is there regarded as essential to a bog. True bogs are most commonly found in northern latitudes, and in districts where great humidity prevails. Their situation is not necessarily low, nor their surface level, some of the great Irish bogs presenting even a hilly appearance. In places naturally moist, by the abundance of springs, or around shallow ponds, the mosses, lichens, heaths, and grasses flourish, which by their spread produce the great peat bogs, or mosses. They encroach upon the ponds and fill them up with luxuriant living vegetation and the accumulations of decayed matter. The moss called *sphagnum palustre* grows most abundantly, and, like the coral in the ocean, the new growth above leaves the lower portion below dead and buried. The famous levels of Hatfield Chase in Yorkshire, which were stripped of their forests by the Romans, were cleared up in the latter part of the 17th century, when vast quantities of excellent timber were found buried beneath the morass. Many of the trees were of extraordinary size, some larger than any now known in Great Britain. Many of them retained the marks of the axe, and some still held the wooden wedges used to rend them. Broken axe heads were discovered, links of chains, and coins of Vespasian and other Roman emperors. The great cedar swamps in the southern part of New Jersey also retain in their peaty soil much valuable timber, the relics of forests of unknown age. An extensive business has long been carried on in extracting this ancient timber and converting it into shingles. The logs are discovered by thrusting an iron rod down through the mud, till one is struck and traced along its length. Some have been found 30 ft. long, and 4, 5, and 6 ft. in diameter, and one of 7 ft. They retain their buoyancy, and float with the side uppermost which was in the swamp the under one. Bogs covered with living forests, like these cedar swamps, receive new accumulations of vegetable matters from the continual waste of their foliage and of the smaller shrubs, which grow among the trees. The forests, once swept off by fire or other cause, are seldom restored. The waters, obstructed by the trunks and branches, stagnate; the mosses then take possession of the surface, and unless this is drained, the spongy covering increases in the manner already described.—In most northern countries bogs are met with of vast extent and in great numbers. They cover such large districts, that they possess a geographical importance, while the materials of which they are composed give them no little geological interest, from the light they shed upon the mode of formation of the more ancient carboniferous deposits of the coal measures. The great peat marsh of Montoire in France, near the mouth of the Loire, is said to have a circumference of 50 leagues. This is somewhat larger than the Great Dismal swamp of Virginia and North Carolina, and but little inferior to the area covered by the swamps that make up the Okefinokee in Georgia, said to be about 180 miles in circumference. But the central portion of Ireland is the great region of bogs. Upon a map of the island is seen, between Sligo and Galway bay, a portion on the western coast, projecting into the ocean from the main body of the island. A strip of this width, extended in an easterly direction across the country, includes about one fourth of the area of the island, and in this portion are found about six sevenths of its bogs, leav-

ing out of the account the small ones not exceeding about 800 acres each. The whole amount of bog surface is 2,831,000 acres, nearly all of which forms one almost connected mass. The great bog of Allen, E. of the Shannon, extends 50 m. in length by 2 to 3 in breadth. This is divided by occasional high lands into several bogs. They all consist of peat, averaging about 25 ft. in thickness, never less than 12 nor more than 42. The upper 10 ft. is composed of a mass of the fibres of the mosses, more or less decomposed, and a light turf of blackish brown color underlies this, in which the fibres of moss may still be perceived. This variety may extend 10 ft. deeper. "At a greater depth the fibres of vegetable matter cease to be visible, the color of the turf becomes blacker, and the substance much more compact, its properties as fuel more valuable, and gradually increasing in the degree of blackness and compactness proportionate to its depth; near the bottom of the bog it forms a black mass, which when dry has a strong resemblance to pitch or bituminous coal, having a conchoidal fracture in every direction, with a black, shining lustre, and susceptible of receiving a considerable polish." (Report of surveyors appointed by parliament, 1810.) In England the largest lowland bog is Chatmoss in Lancashire. It is 6 m. long, 3 m. in greatest breadth, and contains 7,000 acres. It is a mass of pure vegetable matter, without any mixture of sand, gravel, or other material, from 10 to 30 ft. in depth. It is noted for the engineering difficulties it offered to the passage of the first great English railway. George Stephenson carried the Liverpool and Manchester railway over it when all other engineers considered the task impossible.—In the Great Dismal swamp of Virginia and North Carolina, the extent of which is about 40 m. N. and S. and 25 m. E. and W., little true peat appears to be found. The soil is perfectly black, consisting wholly of vegetable matter to the depth of about 15 ft. When dug up and exposed at the surface, it rapidly decomposes. The surface is covered with mosses, reeds, ferns, and aquatic trees and shrubs. The white cedar is abundant as in all our swamps, and they and the tall cypress furnish timber of such value, that the inmost recesses of this tangled morass have been penetrated by canals in search of it. In its central portion the surface is found to be 12 ft. higher than the rest, and the general level of the swamp is above that of the adjoining country. Throughout the country, along the seaboard to the gulf of Mexico, swamps of this character are of frequent occurrence. The outer portions are sometimes wooded swamps, while within they present moss-covered heaths, stretching, like the western prairies, further than the eye can see, and dotted occasionally with clumps or little islands of trees. In New England, the northwestern states, and Canada, the bogs furnish genuine peat, and some of those bordering the great lakes are of great extent. Over one of these the traveller is carried upon the Great Western railroad in Canada, between Chatham and Lake St. Clair. Upon Long Island, near New York city, the bogs present a marked feature along the sandy coast, and their structure was finely exposed in the excavations made for the Brooklyn aqueduct. Here, as elsewhere, they are found to be the repositories of the remains of the mastodon. (See Alluvium, and Peat.)

BOG, a river of Russia. See Bug.

BOG ORE, Meadow Ore, or **Limonite** (Gr. λειμών, meadow), a variety of iron ore, which collects in low places, being washed down in a soluble form in the waters which flow over rocks or sands containing oxide of iron, and precipitated in a solid form as the waters evaporate. It is deposited in the bottoms of ponds as well as swamps, and is found in beds now dry, above the level at which it must originally have been collected, or else these are the product of springs which have now disappeared. The roots of trees appear to have an influence in reducing the peroxide of iron in the sands they come in contact with to the protoxide, by the action of some organic acid. By this action the ore is rendered soluble, and is liable to be precipitated by change to an insoluble salt, induced by the influence of the air or other causes. As the waters run among deposits of vegetable matters, and this change slowly takes place, the oxide of iron replaces the woody fibre, retaining in its more solid material the exact form of the branches of trees, of the small twigs, and even of the leaves, with their delicate reticulations. Deposits of bright red peroxide of iron, made up entirely of masses of these forms, which are true ferruginous petrifactions, are worked as iron ore. Extensive beds exist at Salisbury and Kent, Conn.; also in the neighboring towns of Beekman, Fishkill, Dover, and Amenia, N. Y.; at Richmond and Lenox, Mass.; at Bennington, Monkton, Putney, and Ripton, Vt.; and at numerous other localities in the United States. The bog ore deposits of Monmouth co., N. J., contain them, among other varieties of the ore. In Piscataquis co., Me., a very remarkable and productive bed of these petrifactions has furnished the supplies of ore to the Katahdin iron works. In the ponds of Plymouth co., Mass., bog ores were found so abundantly, that in the early part of this century 10 small blast furnaces were kept in operation by them. As the supplies became exhausted, more ores of the same class were for a time brought from Egg Harbor, N. J. From the bottoms of the ponds the ore was raised into boats, as oysters are gathered, with long tongs. It was found in lumps of various sizes, some weighing even 500 lbs.; but usually it occurs in small, irregular-shaped pieces, or in the form of shot. When taken from swamps, the workmen were careful to cover the cavities with loose earth, leaves, bushes, &c., calculating upon another

growth in 10 or 15 years; but their expectations were sometimes realized in seven years. Ehrenberg has detected in the ochreous matters that form bog iron ore immense numbers of organic bodies, which indeed make up the substance of the ochre. They consist of slender articulated plates or threads, partly silicious and partly ferruginous, of what he considered an animalcule, but which are now commonly regarded by naturalists as belonging to the vegetable kingdom, and are referred to *diatomaceæ* and *desmidiæ*. Bog ore contains phosphorus, arsenic, and other impurities, which greatly impair its qualities for producing strong iron. The pig metal obtained from it, called cold short, is so brittle that it breaks to pieces by falling upon the hard ground; but the foreign matters which weaken it also give to the melted cast iron great fluidity, which causes it to be in demand for the manufacture of fine castings, the metal flowing into the minutest cavities of the mould, and retaining the sharp outlines desired. The iron made from the bog ores of Snowhill, on the eastern shore of Maryland, notwithstanding its great brittleness, brings a high price at the great stove founderies of Albany and Troy, to be mixed with other qualities of metal for producing the best material for their excellent castings. Bog ores are very easily converted into iron, and when they can be procured to mix with other kinds of ore, they produce a very beneficial effect, both in the running of the furnace and in the quality of the iron. For these reasons, as also for the cheapness with which they are obtained, it is an object to have them at hand, though they seldom yield more than 30 to 35 per cent. of cast iron.

BOGARDUS, Everardus, a Dutch-American clergyman, born in Holland, died Sept. 27, 1647. In 1633 he came to New Amsterdam (New York), and became the second minister there, residing in what is now Broad street. In 1638 he married Annetje, widow of Roelof Jansen, who had obtained a grant of a farm of 62 acres in what is now the heart of the city of New York; this farm, long known as the "dominie's Bouwery," in time became vested in Trinity church, and forms the foundation of the wealth of that corporation. Dominie Bogardus had sharp disputes with the successive directors, Van Twiller, Kieft, and Stuyvesant, was complained of by his congregation, and in 1647 resigned his charge, and sailed for Europe to answer to his ecclesiastical superiors in Holland. The vessel ran by mistake into Bristol channel, struck on a rock, was wrecked, and 80 persons, among whom were Bogardus and Kieft, were drowned, only 20 escaping.

BOGARDUS, James, an American inventor, born at Catskill, N. Y., March 14, 1800. At the age of 14 he was apprenticed to a watchmaker, and soon became not only an expert in that art, but a good die-sinker and engraver. He invented an eight-day, three-wheeled chronometer clock, for which he received the highest premium at the first fair of the American institute; and another with three wheels and a segment of a wheel, which struck the hours, and, without dial wheels, marked the hours, minutes, and seconds. In 1828 he invented a "ring-flyer" for spinning cotton, now in general use, and known as the "ring-spinner." In 1829 he invented the eccentric mill, differing from all other mills in having both the grinding surfaces running in the same direction, with nearly equal speed. In 1831 he invented an engraving machine, with which he made gold watch dials, turning imitation filigree work, rays from the centre, and the figures in relief, all by one operation. With this same machine he made the steel die for the first gold medal of the American institute, and also many beautiful medallions. He invented the transfer machine for producing bank-note plates from separate dies, which is now in general use. In 1832 he patented the first dry gas meter, for which he was awarded a gold medal by the American institute; and in 1833 the first pencil case without a slot. In 1836 he greatly improved his meter by giving a rotary motion to the machinery, and made it applicable to all current fluids. It is the parent of all diaphragm meters, this word having been first so used by Mr. Bogardus. At this time he went to England, where he made the celebrated medallion-engraving machine, which, among other portraits, engraved that of the queen, dedicated to her at her request. He made a machine for engine-turning, which not only copied all known kinds of machine engraving, but engraved what it could not itself reproduce. In 1839 a reward was offered for the best plan of carrying out the penny-postage system by the use of stamps, and from 2,600 competitors his plan was selected, and is still in use. After visiting France and Italy, he returned to New York in 1840. He then invented a machine for pressing glass, now in common use; also, a machine for shirring india-rubber fabrics, and another for cutting india-rubber into fine threads. He invented the "sun-and-planet horse power," and a dynamometer for measuring the speed and power of machinery in motion. In 1847 he put in execution his long-cherished idea of iron buildings, by constructing his factory, of five stories, 25 ft. by 90, entirely of cast iron. This was undoubtedly the first complete cast-iron building in the world, and was the first to be represented in the "Illustrated London News." Mr. Bogardus was the first to suggest the construction of wrought-iron beams; and it was from a pattern designed by him that the first were made, both in this country and in England. He claims also to have introduced a new style of architecture, column over column, which he calls the Roman, from the fact that he had never seen it elsewhere than in Italy. After erecting many buildings in New York, in other states, and in the West India islands, he was compelled by ill health to relinquish

this business. Some of his inventions are of scientific interest. His pyrometer, used to ascertain the expansion of metals and stones, is remarkable for delicacy and accuracy; and he claims for his deep-sea sounding machine that it will measure a depth of 10 or 15 miles, if necessary, with absolute accuracy, whatever currents it may encounter; in its use he was the first in 100 years to revive the plan of sounding without a line. His improvements of tools have also been numerous.

BOGDANOVITCH, Ippolit Fedorovitch, a Russian poet, born in Little Russia in 1743 or 1744, died near Kursk, Jan. 18, 1803. He was sent at the age of 11 by his father to Moscow to be educated as a surveyor. Four years afterward he applied to Kheraskoff, the manager of the theatre there, to receive him into the company. Kheraskoff refused his application, but enabled him to enter the university, where in 1761 he was made inspector. He found protectors among the influential nobility, and was sent some years afterward as secretary of legation to Dresden, where he commenced his beautiful romantic poem *Dushenka*, which was not published till 1775. Besides this, his chief work, he published songs, minor poems, and many translations, and edited various periodicals. He was patronized by Catharine II., and after her death retired from the public service, and spent the rest of his days at a country seat in the interior of Russia.

BOGGS, Charles Stuart, an American naval officer, born at New Brunswick, N. J., Jan. 28, 1811. He is a nephew of James Lawrence, commander of the Chesapeake, who fell in the action with the Shannon. He entered the navy in 1826, and served on the Mediterranean station, in the West Indies, the gulf of Mexico, on the coast of Africa, and in the Pacific, becoming lieutenant in 1837. In 1855 he was promoted to the rank of commander, and assigned to the mail steamer Illinois, and in 1858 was appointed lighthouse inspector on the Pacific coast. When the civil war broke out he was placed in command of the gunboat Varuna, of Farragut's gulf squadron. In the attack upon the Confederate forts and squadron at the mouth of the Mississippi, April 24, 1862, the Varuna destroyed six of the enemy's gunboats, but was finally disabled, after driving her last antagonist ashore in flames. When Boggs found his vessel sinking, he tied her to trees on the bank, and fought the guns until the water was above the gun tracks. He was soon placed in command of the sloop of war Juniata, with the rank of captain. He became commodore in 1866; in 1867–'8, commanded the steamer De Soto, of the Atlantic squadron; in July, 1870, was commissioned rear admiral; and in 1871 commanded the European fleet.

BOGLIPOOR, or **Bhaugulpore. I.** A district of Bengal, in the Lower Provinces, bordering on Nepaul, between lat. 24° 15′ and 26° 30′ N., and lon. 86° 15′ and 88° 10′ E.; area, 5,806 sq. m.; pop. about 2,000,000, one third of whom are Mohammedans, and the rest Hindoos and mountain tribes. The district is traversed by the Ganges and several of its tributaries. It is exceedingly hilly, especially in the southwest, and so stony that only a small portion even of the comparatively level land is fit for the plough. **II.** The capital of the district, 200 m. N. N. W. of Calcutta, on the river Ganges; pop. about 30,000, the greater part Mohammedans. The city is of modern erection, has a small Catholic church, a seminary where English is taught, and a Mohammedan college now in a state of decay. In the neighborhood are two round towers of ancient structure, the objects of pilgrimage.

BOGODUKHOV, a fortified town of Russia, in the government and 30 m. W. N. W. of the city of Kharkov; pop. in 1867, 10,069. The chief industry of the town is leather dressing and boot making. It also carries on a considerable trade in cattle and hides.

BOGOMILES. See Basil, a Bulgarian physician.

BOGOTÁ, Santa Fé de, an inland city of the United States of Colombia, capital of the state of Cundinamarca and of the republic, on the picturesque and fertile plateau of Bogotá, 8,671 feet above the sea, in lat. 4° 35′ 48″ N. and lon. 74° 12′ W.; pop. about 46,000. Viewed from a distance the city, slightly elevated above the plain and rising in the form of an amphitheatre, presents a pleasing aspect. Two lofty mountains, the Guadalupe and Monserrate, rise on the east and send down a copious supply of water to be distributed through the town by means of numerous public and private fountains. The streets are regular and bisect each other at right angles, but are narrow, ill-paved, badly lighted, and in many parts covered with grass, the city traffic being exclusively carried on by mules. Streams of water running down the middle of many of the thoroughfares are made the receptacle of filth. Two of these streams, more voluminous than the rest, are called rivers, and are crossed by several neat and well built stone bridges. The Calle Real or principal street runs the entire length of the city, is well paved, and terminates in a spacious square, embellished with a statue of Bolivar, and bordered by an arcade, where a market is held weekly. The private houses are of sun-dried bricks (*adobes*), whitewashed, covered with red tiles, and usually built low on account of the liability to earthquakes. In consequence of the influx of foreigners, the interior arrangement of dwellings has materially improved of late years, as has also the style of building; the old-fashioned grating has very generally been superseded by glass in the windows; walls are painted, and carpets and other furniture are imported from Europe and the United States. There are few chimneys, stoves alone being in use. The stores are for the most part badly kept and dingy, the only admission for light being through the door. Of the public edifices the most noteworthy are

Bogotá.

the government mansion, luxuriously appointed, and occupied by the president and the various officers of the ministerial departments; the house of congress; and the observatory, octagonal in form and comprising three separate piles. Bogotá has a mint, a theatre, a university, a national academy, four colleges, two of which date from the 17th century, and medical, law, normal, and infant schools. There is a museum in which are preserved petrified bones of mastodons from Tunja, the robe or *acro* of Atahuallpa's wife, Pizarro's standard, portraits of the Spanish viceroys, &c. Attached to it are a school of mines and a botanical school. The cathedral, erected in 1814, is richly decorated within. There are 30 churches (inclusive of 9 monasteries and 5 nunneries), 22 of which are in the Calle Real alone. Some are of handsome and all of solid architecture. There are a foundling, a general, and a military hospital; a house of refuge for the relief and education of orphans and the children of the poor; and other benevolent establishments, as also several barracks and an artillery depot, where military equipments are made and repaired. There are a custom house and some good hotels, and two newspapers are published. The inhabitants of Bogotá are chiefly creoles, with half-breed Indians who are exclusively servants; of mulattoes there are few, and negroes are rarely seen. The Bogoteños are intelligent, sprightly, and urbane; the women have a remarkably clear complexion, and are in general handsome and fond of dress. Near the river Funza, here an inconsiderable stream, and in the immediate vicinity of the city, is the *alameda*, tastefully disposed with walks, fringed with trees and rose bushes and other fragrant flowers of luxuriant growth. Owing to the great elevation of the table land of Bogotá, the temperature is mild and equable; the climate, though humid, is not insalubrious, and epidemics are altogether unknown. The thermometer ranges from 45° to 65° F. There are two wet seasons, March to May and September to November, when rains are at times so violent as to deluge the city with the floods which rush down from the mountains, if suitable ditches were not prepared to receive them. The manufactures of Bogotá are limited to cotton and woollen cloths, soap, leather, and precious metal. The fine arts have been cultivated here to an extent altogether uncommon in South America; and in one of the convents are preserved paintings of high merit by Vasquez, a native artist. Communication with the sea is carried on by steamers and barges through the river Magdalena, from the town of Honda (reached in about seven hours) to Cartagena, and to Barranquilla and Sabanilla, situated at the mouth of that river. The total distance is 600 m., and the journey may be performed in from 10 to 15 days; but the trip up stream sometimes occupies twice and even thrice that space of time. The river Meta, in the valley E. of the mountains behind Bogotá, and communicating with the Orinoco, affords easy and commodious communication with the E. provinces of Venezuela and the N. E. shores of the Atlantic.—The plain of Bogotá is 60 m. long from N. to S. and 30 m. wide from E. to W.; it is intersected by verdant prairies and dense woods, affording some ornamental and many useful species of timber. The river Funza, formed by numerous mountain streams which take their rise 100 m. N. of the city, traverses the plain in a S. W. direction to Tequendama, where, through a gap not over 36 ft. in width,

it leaps over a rocky ledge upward of 600 ft. high, forming one of the most magnificent cataracts on the globe, and thence rushes down to join the Magdalena. There are besides several lakes and morasses on the plateau, a number of thermal springs, and many villages and hamlets still known by their primitive Indian names. Coal, iron, and copper mines yield in abundance; there are salt mines, which at an earlier period were leased for 280,000 pesos annually, and still supply the surrounding states; and the celebrated emeralds of Muzo have long met the constant demand for that gem in Europe. Large numbers of cattle are raised, and horses and mules are exported to a considerable extent. The vegetation is extremely luxuriant, but the cultivated grounds are mostly in the vicinity of the capital, producing twice yearly the various European cereals, fruits, and vegetables. The potato is said to have been first carried to Europe from the plain of Bogotá by Sir John Hawkins.—Bogotá, called Santa Fé by the Spaniards, was founded in 1538 by Gonzalo Ximénes de Quesada, who built 12 houses there in honor of the 12 apostles. In 1548 it became a bishopric. It was the capital of the Spanish province of New Granada till 1811, when the republic was proclaimed by the congress assembled here, in imitation of Venezuela, on Nov. 12. In 1816 the city was taken by the Spaniards under Morillo; but it was relieved by Bolivar in the battle of Boyacá, August, 1819. It then became the capital of Colombia; and since the establishment of Venezuela and Ecuador as separate states, it has been the capital of the republic of New Granada (now United States of Colombia), and an archiepiscopal see.

BOGUE, David, a Scottish preacher and author, born in Berwickshire, March 1, 1750, died at Brighton, Oct. 25, 1825. He was educated at the university of Edinburgh, licensed as a preacher in the church of Scotland, and in 1771 went to London, and kept a school at Chelsea for some years. After a visit to Amsterdam in 1776, he became pastor of an Independent congregation at Gosport, Hampshire, and principal of an academy for ministerial education. In 1791 he commenced an agitation through the pulpit and the press, which led to the formation of the London missionary society in 1795. He became head of a seminary founded by that body, and wrote the first tract for the religious tract society, which chiefly originated with him. He was also one of the projectors and first editor of the "Evangelical Magazine," and took an active part in the formation of the British and foreign Bible society. Besides various pamphlets, he wrote an "Essay on the Divine Authority of the New Testament" (1802), which was translated into several languages; in conjunction with Dr. James Bennett, his pupil, friend, and biographer, a "History of the Dissenters" (3 vols. 8vo, 1809; 4 vols., 1812), intended as a continuation of Neal's "History of the Puritans;" and "Discourses on the Millennium" (2 vols., 1813–'16).

BOGUSLAWSKI, Adalbert (Pol. *Wojciech*), a Polish actor and dramatist, born at Glinna, near Posen, in 1752, died in Warsaw, July 23, 1829. He went upon the stage in Warsaw in 1778, and from that epoch to 1809, at which time he was finally settled as the manager of the theatre in Warsaw, he wandered through Poland, establishing theatres in various cities. He translated plays and operas from the French, English, and Italian, and composed many original dramas of a national character. His plays were published at Warsaw in 1820–'25, in 9 vols.; and his original works were collected in 3 vols., 1849–'54.

BOHA-EDDIN, or Bohaddin, Abul-Mohassen Yusuf ibn Shedad, an Arabian scholar and historian, born in Mosul in 1145, died in Aleppo about 1233. Having attained proficiency in Moslem law, he became at the age of 27 a lecturer at Bagdad. In 1186 he made the pilgrimage to Mecca, and returned through the Holy Land, visiting Jerusalem, Hebron, and other sacred cities. While in Damascus, being summoned to the Moslem camp by Saladin, he wrote a treatise on the "Laws and Discipline of Sacred War," praising Saladin's policy. Saladin appointed him cadi of Jerusalem and of the army, and a strong attachment subsisted between them. On the death of Saladin he transferred his attachment to his son Malek Dhaher, whom he was instrumental in establishing on the throne of Aleppo. In return, Malek appointed Boha-eddin cadi of that city, which brought him constantly to reside in the royal court. Aleppo now became the resort for men of science and learning, and Boha-eddin founded a college, where he continued to give lectures till his death. His great work, the "Life of Saladin," was published by Schultens at Leyden in 1732, with notes, maps, and a Latin translation.

BOHEMIA (Boh. *Čechy;* Ger. *Böhmen*), a country of central Europe, now forming a political division of the Austro-Hungarian monarchy, between lat. 48° 33′ and 51° 5′ N., and lon. 12° 5′ and 16° 46′ E., and bounded N. W. by Saxony, N. E. by Prussian Silesia, S. E. by Moravia and Lower Austria, and S. W. by Upper Austria and Bavaria; length E. and W., 200 m.; breadth N. and S., 170 m.; area, 20,064 sq. m.; pop. in 1871 (estimated), 5,173,541. The capital is Prague, on the Moldau. The boundary line follows the high mountain ranges of the Erzgebirge (Ore mountains), Riesengebirge (Giant mountains), Moravian mountains, and Bohemian Forest, which separate it from Saxony, Silesia, Moravia, and Bavaria, respectively. These ranges make Bohemia an elevated quadrangular basin, with a waterslope toward the centre and north, and drained by the river Elbe and its affluents. The Erzgebirge, running N. E. and S. W., are a wooded range with a more gentle declivity toward Saxony than toward Bohemia. At the southwest this

range touches the Bavarian Fichtelgebirge (Pine mountains); and from near this group stretches southeasterly to the extreme south of the country the range of the Bohemian

Bohemian Peasants.

Forest, wild and precipitous, and intersected with deep ravines. The slope of these mountains is abrupt toward Bohemia; they are covered with forests and swamps, infested with bears and wolves, and are a part of what was known to ancient geographers as the Hercynian forest. Their geological formation is the primitive granite and gneiss, and they furnish gold, silver, lead, iron, coal, zinc, black lead, cobalt, and antimony. The Moravian mountains run N. E. from the southern to the eastern portions of Bohemia, and form the watershed between the Elbe and Moldau flowing N., and the Danube and March flowing E. and S. The Riesengebirge, running from the E. extremity of Bohemia toward the Erzgebirge in the north, present their broken and abrupt descent toward Bohemia, and their higher summits are bleak and naked. The interior is undulating with hills, sometimes steep, but rising gradually to no greater height than 600 ft.—The river system comprises only the Elbe and its tributaries. The Elbe from the mountains in the northeast, the Sazawa from the southeast, the Moldau from the southern extremity of the Bohemian Forest and the pond and marsh district around Budweis in the south, and the Beraun and Eger from the western mountains, converge toward the centre of Bohemia, and joining at no great distance from Prague flow north in one stream, the Elbe, which passes into Saxony through a channel which it has cut in the sandstone formation of the eastern Erzgebirge. The Elbe and the Moldau are to a great extent navigable. Bohemia has no large lakes, but has numerous ponds, according to some statements as many as 20,000, and as many as 160 mineral springs which are visited. Of these the saline chalybeate at Franzensbad and Marienbad, the warm alkaline at Carlsbad and at Teplitz, and the bitter and cathartic waters at Seidlitz, Saidschitz, and Püllna, are the most celebrated.—The whole mountain system which encircles Bohemia is of primitive formation, characterized by granite and gneiss, with the exception of a small section where the Elbe cuts through the Erzgebirge and a point on the northwest near Braunau. There are several sandstone masses in the centre of the country, and in many parts hills of basalt. The mineral products are more varied than in any other country of the same size. The lead mines in 1870 produced 22,125 cwt. of lead and 30,780 lbs. (*Münzpfunde*) of silver. The product of iron in 1870 was 1,277,943 cwt., and of coal 88,281,013 cwt. There are also mines of tin, copper, zinc, cinnabar, arsenic, and cobalt, and quarries of marble, alabaster, quartz, granite, freestone, and sandstone. A large variety of precious stones are found, of which the finest are the Bohemian garnets.—The climate is healthy; the atmosphere clear and salubrious, with a mean temperature of 48° F. at Prague, but much lower in the mountain districts, where the snow frequently lies 12 ft. deep, and often does not disappear until the middle of April, and in some localities stays through the year.—The soil is mostly a clayey loam, and except on the high parts of the mountains, and in some sandy tracts of the Elbe valley, is generally very fertile. The productive land is estimated at 12,259,362 acres, of which nearly one half is under the plough, the remainder being vineyards, orchards, meadows, pastures, and forests. Rye, oats, wheat, and barley are raised in large crops.

Braunau, Bohemia.

Flax is extensively cultivated, and hemp, tobacco, and hops are also staple products. There is an annual manufacture of about 250,000 gallons of inferior wine, and an annual yield from

the forests, which cover one fourth of the surface of the country, of 3,000,000 cords of wood, besides timber. The horses of Bohemia are of a superior breed, but the horned cattle are small. According to the census of 1869, there were 189,327 horses, 1,602,015 cattle, 1,106,290 sheep, 194,273 goats, and 228,180 hogs.—In manufactures Bohemia is by far the most important of the provinces of Austria. The production of linen goods, partly of the finest description, employed in 1871 about 50,000 persons, and the aggregate value of the linen goods was 30,000,000 florins. Lace making by hand formerly supported over 40,000 persons at the north, but has greatly decreased since the invention of machine lace, and is now limited to the region between Waldstein and Catharinaberg in the Erzgebirge. Cotton manufactories are increasing; in 1871 there were over 540,000 spindles, producing about 112,000 cwt. of yarn; nearly 60,000 looms were employed on calicoes. These manufactories are in the northern region, next the Erzgebirge, but the woollen factories, of which in 1871 there were 350, are more numerous in the northeast, near Reichenberg. There are over 50 leather factories, and the gloves of Prague are much in demand. The paper mills, of which there were in 1871 more than 70, are particularly numerous in the district of the Eger and in the Riesengebirge. The Bohemian glass factories, about 120 in number, producing annually about 6,000,000 florins and employing 24,000 persons, are renowned all over the world, and work mostly for export, particularly to America; the imitation gems, the looking-glass, and fine ornamental glass ware are unsurpassed. The china, earthen, and stone ware produced in 1871 (about one half in the circle of Eger) were valued at 2,500,000 florins. The iron industry has its centre in the region of Pilsen, Pribram, Horzowitz, and Pürglitz; the value of the raw and cast iron produced in 1871 was 1,500,000 florins. The machine factories, the most important of which were in and near Prague, produced machines and tools to the value of 4,500,000 fl. The value of the products of the entire metal industry amounted to about 16,000,000 fl. There are also more than 100 factories of chemicals, mostly in the regions of Pilsen, Aussig-Tetschen, and Falkenau. The factories of beet sugar, more than 130 in number, produced in 1871, 3,400,000 cwt. The total industrial products of Bohemia are valued at 218,000,000 florins. Its commerce is also rapidly developing, owing to the favorable situation of the country. The exports in 1871 amounted to 22,000,000 fl., the imports to 20,000,000. The number of breweries in 1868 was 968, of distilleries 324.—Of the population the Germans constitute about 37 per cent., the Czechs 61, and the Jews 2, the latter using generally the German language. The Germans inhabit in compact masses the northernmost quarter of the country, the mountainous districts, and form a great part of every city and town population, being more given to industrial pursuits; while the Czechs, belonging to the same tribe as the Moravians, are the more agricultural portion of the population, and of all Slavic tribes in many respects the most gifted and cultivated. They are preeminently a musical people, and are fond of song and poetry. With the exception of 45,331 Lutherans, 58,720 Reformed, and 89,539 Jews, nearly all are Roman Catholics. There were 4,008 public schools in 1868, of which 1,762 were German, 2,165 Czech, and 81 mixed. There were 46 high schools of different grades, 11 agricultural schools, 2 mining schools, 1 military school, and 4 theological institutions. The capital, Prague, has 2 polytechnic institutions, one for the Germans and one for the Czechs, and a university. The majority of the professors of the university are Germans, but most of the students are Czechs. The conflict between the German and Czech nationalities has become very animated, and is from year to year assuming larger dimensions. The Czechs chiefly act through the secretaries of the district and communal authorities, while the Germans have established throughout the country political associations. The leaders of the German party from 1862 to 1872 were Herbst, Hasner, Schmeikal, and Pickert. The Czechs, though united in the conflict against the Germans, have in political questions split into the conservative old Czechs, headed by Palacky and Rieger, and the democratic young Czechs, whose foremost leader is Sladkowsky. The diet of Bohemia has 241 members, consisting of the archbishop of Prague, the three bishops of Budweis, Leitmeritz, and Königgrätz, the rector of the university of Prague, 70 delegates of the *Grossgrundbesitz* (large landed estates), 72 delegates of the towns and industrial places, 15 delegates of the chambers of commerce and industry, and 79 delegates of rural communities. The diet elects 54 delegates to the Reichsrath of Vienna, and also a standing committee, the *Landesausschuss*, which is presided over by an *Oberst-Landmarschall* appointed by the emperor. For administrative purposes Bohemia is now (1873) divided into 89 districts and 2 independent communes.—The earliest inhabitants of Bohemia were the Boii, a people supposed to have been of Celtic race, from whom the country received its name. In the 1st century B. C. they were driven out by the Germanic Marcomanni, whose realm flourished for a time under Marbod, the rival of Arminius. This people, however, subsequently emigrated (~~or were driven into Bavaria,~~) and Bohemia was occupied in the 6th century by the Slavic Czechs, who also established themselves in Moravia. Portions of the country were about the same time colonized by Germans. The Czechs maintained their independence, under national chiefs, between the Avars and the Frankish empire, though often harassed by invasions. The house of Premysl (Przemysl) became preëminent in the nation. Christianity was intro-

duced from various quarters, but chiefly in its Slavic form by the converts of Methodius about 890, when the king of Moravia, Swatopluk, ruled Bohemia. When the Magyars destroyed his Moravian kingdom, the Bohemians voluntarily sought annexation to the German empire, with which they remained connected, in spite of the endeavors for independence of Duke Boleslas I. (936–'67), the murderer of his brother and predecessor St. Wenceslas. Under his successor, Boleslas II., the boundaries of the country were extended to the Vistula, but subsequently it succumbed for a time to Poland. Wars with this country were often renewed, Silesia being the main object of contention, and ultimately kept by Bohemia. About 1035 Bretislas I. annexed Moravia. The native dukes in 1158 received the kingly dignity from Frederick I. Wars of succession convulsed the country until Ottocar I. (1197–1230), a truly great monarch, made the royalty hereditary. By conquest he and his son Ottocar II. (1253–'78) extended their dominion over a part of Poland, Austria, and Prussia, where the latter, on a crusade against the heathen Borussians, founded the city of Königsberg. After a short struggle against the emperor Rudolph I., in which Ottocar II. perished (see Ottocar), the Bohemian monarchs acquired Poland and Hungary by election; but with the assassination of Wenceslas II. (1305) the native ruling house was extinguished, and was succeeded by the house of Luxemburg, until that line in 1526 was superseded by Austrian monarchs. Charles (1346–'78), who as German emperor was insignificant, was a great king for Bohemia, which he augmented by Lusatia and other acquisitions, which were soon lost. Under his reign the country flourished. Prague, then containing the only German university, numbered 30,000 students; science and art were fostered, and manufactures, particularly those of glass and linen, were founded. From the beginning of the 15th century, when Charles's profligate son Wenceslas occupied both the imperial and the royal throne, ideas of reformation began to spread by the teachings of Huss and Jerome of Prague, whose death at Constance in 1415 and 1416, and the intervention of the emperor Sigismund, the brother of Wenceslas, caused the outbreak of the Hussite war (see Hussites). Under the sway of the Hussites the throne of Bohemia was filled by election, for a time from the Luxemburg line, once (1458–'71) by a native nobleman, George Podiebrad (see Podiebrad), and subsequently from the Polish line of the Jagiellos. When the second Bohemian king of this line, Louis, who was also king of Hungary, perished at Mohács (1526), his brother-in-law Ferdinand of Austria, the brother of Charles V., was crowned king, and in 1547 made the crown hereditary in his house. (See Austria.) In 1618 the Bohemians, under Protestant lead, rose for the restoration of their liberties, and this revolt opened the thirty years' war. In 1619 they chose the elector palatine Frederick V. as their king, but succumbed in the battle at the White mountain, near Prague, in 1620. The most cruel persecution commenced; the Protestants were executed, imprisoned, and banished, and their estates confiscated. The constitution was abolished, the Czech literature, school system, and nationality proscribed, and the native state with its civilization annihilated. No fewer than 36,000 families were forced to seek refuge in Saxony, Sweden, Poland, Holland, Brandenburg, and elsewhere. This, and the sufferings of the thirty years' war, devastated the land. German Catholics were introduced as colonists, and everything German was favored and preferred to such an extent, that the Germans of Bohemia for more than a century furnished more than half of all the officers in the Austrian provinces. The country became intensely Catholic, but the spirit of Czech nationality reawoke after the French wars. The revolution of 1848 inverted the position of the parties toward the Austrian government: the Germans of Bohemia, in common with a majority of the Austrian Germans, opposed their government; the Czechs in Bohemia, together with the other Slavic populations of the empire, looked for a great Slavic empire in Austria, and, in spite of the bombardment of Prague, where a Slavic congress was assembled in June, 1848, supported the imperial authorities. Since that time the political struggles of the Czechs for renewed national autonomy have played a very prominent part in the history of the Austrian empire, while Bohemia itself, which witnessed some of the principal contests in the Hussite, thirty years', and seven years' wars, once more became a great theatre of war in 1866 (battle of Sadowa, July 3).

BOHEMIAN BRETHREN, a Christian society which originated in the Hussite movements of the 15th century, and rejected the mass, purgatory, transubstantiation, prayers for the dead, and the adoration of images, and contended for the communion in both kinds. The origin of this sect is traced to Peter of Chelcic, who about 1420 protested against any interference of the secular power in matters of faith, and demanded a return of the church to the institutions of the apostolic age. About 1450 an ecclesiastical organization was in existence, composed mainly of remnants of the Taborites (see Hussites), and called the "Chelcic Brethren," who lived retired from the world, regarded oaths and military service as mortal sins, and denounced the Roman Catholic church as the church of Antichrist. They were favored by the Calixtine archbishop Rokitzana, and under the leadership of Gregory, a nephew of Rokitzana, a considerable number of adherents of these doctrines settled on an estate belonging to George Podiebrad, then regent of Bohemia, and known as the barony of Liticz. The Calixtine priest Bradacz became their spiritual head. In 1460 the first synod

of the Brethren was held at Liticz, which severed their connection with the Calixtines and adopted the doctrine of the merely spiritual presence of Christ in the eucharist. Henceforth Rokitzana and Podiebrad, who had been raised to the throne, were outspoken enemies of the Brethren, who sought refuge from persecution in the caves, and thus received the name of cave-dwellers (*Grubenheimer*). The Brethren themselves adopted for their organization the name of the Unity of Brethren (*Unitas Fratrum*). The organization increased rapidly amid persecution; at the beginning of the Lutheran reformation it numbered 400 congregations with 200,000 members. The great persecution under Ferdinand I., in 1547, drove a number of the Brethren into Poland and Prussia. In Poland the organization became so flourishing that the Polish congregations were received into the communion of the Brethren as a separate province. These congregations united with the Lutherans and Reformed in the *Consensus Sandomiriensis* (1570), while in Bohemia and Moravia they presented conjointly with these two Protestant denominations the *Confessio Bohemica* to the emperor Maximilian II. (1575). After Rudolph II. had granted religious toleration, the Brethren were represented in the evangelical consistory of Prague by one of their bishops. Under Ferdinand II. they were compelled either to join outwardly the Roman Catholic church or go into exile (1620). By those who preferred exile a number of congregations were established in Prussia, Poland, and Hungary, which maintained themselves until the death of their bishop Amos Comenius (1671), when they became merged in the Lutheran and Reformed congregations. The Brethren in Poland ultimately united with the Reformed church, and continued the consecration of bishops in the hope of the restoration of the *Unitas Fratrum*. The same hope was entertained by the remainder of the Brethren in Bohemia and Moravia, who kept up secret meetings. Their hopes were fulfilled by the new organization which owes its origin to Count Zinzendorf. (See MORAVIANS.) The relation of the Bohemian Brethren to the Waldenses has not yet been fully cleared up by historical investigators.—At the head of the church were bishops, priests, and deacons as assistants of the priests. The bishops had the exclusive right to ordain. Each of the bishops had a diocese; conjointly they formed the supreme church council, which was presided over by the primate. This council, which also embraced from six to eight assistant bishops, appointed all the preachers, but was itself responsible to the synod, which met every third or fourth year. The church was divided into three provinces, the Bohemian, Moravian, and Polish. The discipline of the church consisted of three degrees: first, private admonition and censure; secondly, public censure and exclusion from the Lord's supper; lastly, exclusion from the communion of the church. The Brethren were noted for their literary activity and their schools; their most celebrated work was the Kralitz translation of the Bible in the Bohemian language. The knowledge of the history of the Brethren was greatly promoted by the discovery in 1862 at Lissa of a part of the old archives of the church, and a number of able historical works have since been written on the subject. The most important sources of information are: Gindely, *Geschichte der Böhmischen Brüder* (Prague, 1857); Cröger, *Geschichte der alten Brüderkirche* (Gnadau, 1865); De Schweinitz, "The Moravian Episcopate" (Bethlehem, Penn., 1865); Benham, "Origin and Episcopate of the Bohemian Brethren" (London, 1867).

BOHEMIAN LANGUAGE AND LITERATURE. The word Bohemian is improperly applied to the principal nation of the western Slavs. The true name of the people is Czechs (*Čechi*, pronounced *Tchekhi*), from *četi*, to begin, as they believe themselves to be the first of the family. The language is the harshest, strongest, most abounding in consonants, and at the same time the richest and most developed of the many dialects of the Slavic family, which itself is the northernmost relative of the Sanskrit, the culminating tongue of the Aryan stock. Nearest to the Czech are the Moravian and the Slovak of N. W. Hungary, both sub-dialects, and the Sorabo-Wendic of Lusatia, a cognate dialect. The southern and southwestern Slavs had obtained letters from Cyrillus who modified the Greek alphabet, and the Glagolitic characters, wrongly ascribed to St. Jerome, before the Latin mode of writing was adopted by the other branches of the family, in the form of the black letter, and recently in the Italian shape. In this language there are the five Italian vowels (both short and long—when long, marked by an accent), with an additional *y* (short and long), which is duller and heavier than *i*; one diphthong, *ou* (pronounced as in *our*); the pseudo-diphthongs of all the vowels with a closing *y*, and the diphthong *ě*, pronounced *yé*. *B*, *d*, *f*, *k*, *l*, *m*, *n*, *p*, *v*, sound as in English; but *c* is pronounced as if written *ts* in English; *g* before *e*, *i*, *y*, like *y* in *yes*; *h* harsher than in *hen*; *r* trembling and rolling, and not slurred over as in the English *marsh*, *park*; *s* always as in *sap*; *t* always as in *tin*; *w* like the English *v*; *z* always as in *zeal*. The following letters with the diacritic sign (ˇ) are pronounced —*c* like English *ch* in *chat*; *s* like *sh* in *shall*; *z* like the French *j*, or the English *zi* in *glazier*; *r* like the Polish *rz*, almost like *rzh*, as much as possible in one utterance; *d* like the Magyar *gy* (*dy* in one utterance); *t* like the Magyar *ty*; *n* like the Italian *gn* in *signore*, or Magyar *ny*. There is also a peculiar letter *l*, with a cross bar as in Polish, having a heavy and dull sound unknown to the English. The letter *x* occurs only in foreign words. The combination *ch* is pronounced as in German, being the most strongly aspirated guttural sound; the trigramma *sch* represents two

sounds, viz., *s* and *ch*, as in the German word *Gläschen*. *Cz* was formerly used for *č*, *rz* for *ř*, and *sz* for *š*.—The Czech language has no article, but has declinable demonstrative pronouns. It has three genders, eight declensions, seven cases (nominative, genitive, dative, accusative, vocative, instrumental or sociative, and locative); three numbers (a dual only in nouns and pronouns); two kinds of adjectives, determinate and indeterminate; organic and periphrastic degrees of comparison; declinable numerals; six forms of the verb (with but one inflection), six modes (indicative, imperative, conjunctive, optative, conditional, and transgressive or participial). The passive voice and the future tenses are made by means of auxiliaries; but the terminations of persons and numbers are not less developed than in Greek and Latin. Great liberty in the sequence of words characterizes the syntax, which is analogous to the Greek and Latin. Metre predominates over the tones in the vocalism of words, so that the Czech language can vie with the Magyar in rendering Greek and Latin poetic rhythm. Great variety, force, and phonetic symbolism in the deriving affixes, enrich the language with a great number of expressions, and make up for its scantiness of metaphony.—Joseph Dobrovsky, the great Slavic linguist, divides the history of the Czech language and literature into six periods, commencing respectively with the following epochs: 1, the immigration of the Czechs; 2, their conversion to Christianity, A. D. 845; 3, King John of Luxemburg, 1310; 4, John Huss, who introduced a precise orthography, 1410; 5, the extension of printing, and the accession of Ferdinand I. of Hapsburg, 1526; 6, the battle at the White Mountain, and the expulsion of the non-Catholics, 1620. The discovery in 1817 of a part of the *Rukopis kralodvorsky* (manuscript of Königinhof), by Hanka, in a church steeple, brought to light a collection of 14 lyric and epic poems, alleged to have been written between the years 1290 and 1310, and superior to most of the contemporary productions of other European nations. There are about 20 poetic and 50 prose works extant belonging to the epoch before Huss, such as Dalimil's chronicle in verse, of 1314; a song of 1346, on the battle of Crécy, where King John fell, and other historic legends; Thomas Stitny's book for his children, 1376; Baron Duba's judicial constitution of Bohemia, 1402; a politico-didactic poem, by S. Flaska of Richenburg; and various allegoric, dramatic, and elegiac compositions, besides translations of foreign works. Charles I. of Bohemia, known as Charles IV., emperor of Germany, founded in 1347 the Benedictine monastery of Emaus, in the Neustadt of Prague, for monks who had fled hither from Croatia and in 1348 the university of Prague. John Huss revised the translation of the Bible, wrote tracts and hexameter poetry, and gave a great impulse to the activity of the Czech mind. Notwithstanding the wholesale destruction of the Hussite writings, there yet remain, hidden in archives and libraries, many productions of the Calixtines, Taborites, Horebites, Orphanites, and other Hussite sects, some of them by mechanics, peasants, and women. Many of these works were carried off by the Swedes, and are now in the library of Stockholm. Mere rhyming, however, prevailed over poetic inspiration in most of the verse of those times. But the prose works of the 15th century, especially the state papers, are models of composition: concise, clear, and emphatic in style; so much so, that the Czech language was about to become a general means of civilization for all Slavs, and was even used in Lithuanian official documents. John Ziska, the leader of the Hussites (1419–'24), composed war songs, and a system of tactics for his troops. The work of Hayek de Hodetin, and especially that of Wenceslas Vlček de Cenow, on Hussite strategy, are more important. The accounts of the travels of Albert Kostka de Postupitz to France (1464), of Leo de Rosmital through Europe (1465), of the Bohemian Brother Martin Kabatnik in Asia Minor and Egypt (1491), of John de Lobkowitz to Palestine (1493), &c.; the spirited and elegant political work of Ctibor de Cimburg, the classic production of the same sort by V. C. de Wszehod, "The Art of Governing," and the great encyclopædia of the canon Paul Zidek, with many works on economy, popular medicine, &c., are monuments of the Czech intellect in the latter half of the 15th century. After 1490 the kings ceased to reside in Bohemia, and German Catholics began to pour into the country. Nevertheless, Czech literature attained its golden age between 1526 and 1620, especially under Rudolph (II. as emperor of Germany, 1576–1612), when the sciences and arts were zealously cultivated by all classes of society. Kepler (though a German) presided over the astronomic observatory at Prague, which then had two universities and 16 other literary institutions, including schools for females as well as males. The Czech tongue was now more developed even than the German, and was used in all transactions; in point of style the works of this period are inferior to those of earlier times, but the political and legal literature is superior to the rest. The following works are worthy of mention: George Streyc's psalms; Lomnicky's poems; Charles de Zerotin's memoirs and letters; Wenceslas Hayek de Liboczan's romantic chronicle of Bohemia; Barto's work on the religious troubles of 1524; Sixtus de Ottendorf's work on the diet of 1547; John Blahoslav's history of the Bohemian and Moravian brethren, perhaps wrongly ascribed to him; a universal history, now at Stockholm, by an anonymous author, but rich, clear, and trustworthy; genealogies and biographies by Brzezan; an excellent history by Veleslavin; the travels and fortunes of Ulric de Wlkanowa, Wenceslas Vratislas de

Mitrowitz, and Christopher Harant de Polzitz, &c. Matthew Benesovsky's glossololgy, and Abraham de Ginterrod's classic archæology, are also memorable. There are several good works on judicial affairs and on religious subjects; for instance, that of Augusta, a bishop of the Bohemian Brethren. The translation of the Bible published by this society reached eight editions. It is in pure and elegant Czech, and was translated from the original in the castle of Kralitz in Moravia, by a society which Joseph Zerotin had collected and maintained there from 1579 to 1593. Count Slavata, one of the imperial Catholic party, who was thrown from a window of the castle of Prague by Count Thurn's associates in 1618, left a detailed documentary history of his times, in 15 vols. folio. That act of violence opened the thirty years' war, and brought about the sudden fall and decay of Czech civilization, which then sank to a low degree of debasement. The best men of the country perished by the sword and pestilence; others emigrated; German, Italian, Netherlandish, Spanish, and Irish adventurers took their place in all offices, dignities, and emoluments. Ferdinand II. imported Benedictines from Montserrat in 1624; and the Jesuits, escorted by the soldiery, ransacked every house for Bohemian books, burning all those published after 1414 as heretical. This state of things lasted far into the 18th century. While it prevailed, many of the so-called Bohemian heretics and rebels Germanized their very names. The Jesuit Anton Konias, who died in 1760, boasted of having burnt 60,000 books. The exiles, however, continued to cherish their native literature, and printed several books in Poland, Saxony, Holland, &c. The Hungarian Protestant Slovaks did very much in preserving Bohemian letters. In Bohemia and Moravia there appeared but few works, among them Bezovsky's chronicle, the lays of Volney, and the hexameter essays of Rosa. John Amos Comenius, the last bishop of the Bohemian Brethren, wrote an *Orbis Pictus* in several languages, and although his Latinity is barbarous, his native style is pure, lively, and forcible. The Swedes, who were expelled from Bohemia in 1640, carried many literary treasures home, among others the *Azbukividarium* or *Alphabetum Slavorum*, in Glagolitic characters, on parchment, now in the great book at Stockholm; also the *Alphabetum Rutenum* in Cyrillic characters. The empress Maria Theresa decreed, Dec. 6, 1774, the cessation of persecutions against the Protestants, and remodelled the system of education, introducing normal and other schools. Joseph II. ordered that German should be the language in the high schools and in all public affairs. But, thanks to the exertions of Count Francis Kinsky, and of the historian Pelzel, the Czech language was introduced into the higher military institutions, and the sciences were freed from German trammels. The Czech culture soon rose from its long lethargy, and writers appeared in all branches of literature, among whom the following must be particularly mentioned: Pelzel, Prochazka, Kramerius, Parizek, an author of good school books, and Tomsa, a linguist. The father of modern Bohemian poetry was Anton Puchmayer, a clergyman (1795–1820), who was also well versed in Polish and Russian. He was followed by the brothers A. and T. Negedly, Rautenkranz, Stepniczka, Hnievkovsky, who was also a good prose writer, Svoboda, and especially Jungmann, and Chmelensky, a lyric poet. The higher classes, however, continued to be estranged from native letters until lately, although since 1776 a chair for the Czech language has existed even in the university of Vienna. Printing had been introduced into Bohemia in 1476, and Vrtatko lately even claimed a share in its invention in favor of Bohemia, on the ground that Gutenberg was originally from that country, and that the press was freely developed in it, without the aid of Germans. The above-mentioned discovery of Hanka, the introduction of the Czech tongue in the high schools, the efforts of the supreme burggraf Kolowrat in the foundation of a national museum (1822), and other favorable circumstances, have more recently produced a sudden rise of Bohemian literature. We must be content with notices of its more prominent writers and productions. Schafarik and Palacky first recommended the old metres in verse. A committee on the language was formed in the museum in 1831. Langer wrote lyric, didactic, and satiric poems; Roko, an epic; Holly, an epic, *Svatopluk*, and a "Cyrillo-Methodiad;" Kollar, elegies; Schneider, songs and popular ballads; Stiepanek, Klicpera, Mahacek, Vocel, and Turinsky, dramas. Opera libretti were produced by the last named, by Svoboda, and by Chmelensky. Prizes were offered for the best dramatic works, and a national theatre was founded by subscription. The foremost of the modern poets are Kollar, whose masterpiece is the *Slavy dcera* ("Daughter of Glory"), and the song-writer Celakovsky. In tales the favorite author is Erben; and the songs and ballads of Schneider are in the mouths of all. Among the properly romantic poets we find Macha, Halek, Neruda, Fric, and Barak, most of them living. Czech fictitious literature is comparatively poor. We must also mention Jungmann's "History of Bohemian Literature," Schafarik's "History of Slavic Literature," and the latter's translations from Aristophanes, Schiller, Bürger, and others. A new scientific glossology was produced by Presl, professor and director of the cabinet, and author of many works on natural history. Palacky is at the head of the historical school, and is a writer on æsthetic and critical subjects. So was Schafarik, who also wrote an eminent work on "Slavic Antiquities" (3d ed., 1863–'4). Philosophy, theology, the natural sciences, and mathematics have found numerous votaries. Of late, owing to the liberty of the press and the all-absorbing

nationality struggle, Czech literature has taken a more political turn, the periodical press being particularly active. Czech grammars and dictionaries are numerous, some of them, like the works of Dobrovsky, Celakovsky, and Jungmann, of great philological value.

BOHEMOND, Marc, a Norman crusader, born about 1060, died in 1111. He was the eldest son of Robert Guiscard, the conqueror of Apulia and Calabria, and commanded with distinction in the wars of his father against the Byzantine emperor Alexis, 1081–'5. After his father's death he was excluded from the throne of Apulia by his younger brother Roger, and obtained as his inheritance the city of Taranto. Desirous of conquest and new glory, he joined the crusaders in Epirus with a large army (1096), and took a prominent part in the capture of Antioch in 1098. He retained possession of this city, and, taking no part in the siege of Jerusalem, endeavored to found an independent principality in Syria. After various adventures he returned to Europe, leaving his kinsman Tancred in Antioch, married a daughter of the king of France, and beginning a new war against Alexis, crossed the Adriatic with 5,000 horse and 40,000 foot, assembled from various parts of Europe, and laid siege to Durazzo. The war, however, was disastrous to the Normans. Bohemond was compelled to conclude a treaty of peace, and soon after died. His son, Bohemond II., succeeded to the principality of Antioch, which fell under Bohemond VI. in 1268.

BÖHL FABER, Cecilia, a Spanish authoress, known under the *nom de plume* of Fernan Caballero, born at Morget, Switzerland, in 1797. Her mother was a Spaniard, and her father, Nikolas Böhl von Faber, the son of a Hamburg merchant established in Spain, and the author of *Floresta de rimas antiguas castellanas* (3 vols., Hamburg, 1821–'5) and *Teatro español anterior á Lope de Vega* (1832). The daughter was educated in Germany, and went with her father to Spain in 1817. She was married successively to Col. Planells, the marquis of Arco Hermoso, and Antonio de Arron, Spanish consul in Australia. After the death of the last, in 1863, she was enabled, through the patronage of the duke de Montpensier, to reside in the royal palace at Seville. She has written on the traditions, customs, and social characteristics of Spain, especially of Andalusia, a series of novels, fairy tales, and ballads. A collection of her works appeared at Madrid in 13 vols., 1860–'61, an additional volume at Cadiz in 1862, and in 1865 appeared her *Novelas originales*. Her principal productions have been translated into French, and some of them into English. In Germany translations of her works appeared at Paderborn in 17 vols., 1859–'64.

BOHLEN, Peter von, a German orientalist, born at Wüppels, Oldenburg, March 13, 1796, died in Halle, Feb. 6, 1840. He was of humble origin and had to struggle with adversity till 1817, when the freemasons of Hamburg enabled him to study at the gymnasium of that city, and he perfected his knowledge of oriental languages in Halle and Bonn. In 1822 he became adjunct professor at Bonn, and in 1825 professor extraordinary of oriental languages in Königsberg, and in 1830 ordinary professor. He visited England in 1831 and 1837, and for the improvement of his health he spent some time in southern France, whence he removed in 1839 to Halle. His principal works: are *Das alte Indien* (2 vols., Königsberg, 1830–'31); his edition of Bhartrihari's *Sprüche* (Berlin, 1833, with a German translation, Hamburg, 1835); *Die Genesis, historisch-kritisch erläutert* (Königsberg, 1835); his edition of Kalidasa's *Ritusanhâra* (Leipsic, 1840); and his *Autobiographie*, edited by Voigt (Königsberg, 1841; 2d ed. with his correspondence, 1843).

BÖHM, Theobald, a German flutist, born in Bavaria in 1802. In 1834 he went to London, and in 1849 returned to his native country, where he entered the private service of the king. He was considered almost without a rival as a flute player, and also set himself the task of perfecting the mechanism of flutes and other reed instruments. His efforts resulted in the construction of what has since been known as the Böhm flute, which has, by reason of the greater accuracy and equality of its scale and the superior facility of the fingering, gradually superseded the old models. Böhm also made several universally accepted improvements in the oboe and the bassoon. As a composer he has acquired a considerable celebrity. He has written several concertos for flute and orchestra, and has published a treatise on the construction of the flute.

BOHN, Henry George, an English publisher, of German parentage, born in London, Jan. 4, 1796. He commenced in 1845 the republication of rare standard works, selected from all the national literatures of Europe, in the English language, and in a cheap form. For many years he issued in a uniform shape series entitled "Standard Library," "Scientific Library," "Illustrated Library," "Library of French Memoirs," Library of Extra Volumes," "Classical Library" (consisting of translations of the Greek and Latin classics), "Antiquarian Library," "Philosophical Library," "Philological Library," "Library of British Classics," "Ecclesiastical Library," "Miniature Library," and "Cheap Series," amounting in all to between 600 and 700 volumes. Mr. Bohn translated for these series some of the works of Schiller, Goethe, and Humboldt, assisted in several of the classical translations, and compiled a "Handbook of Pottery and Porcelain," "Handbook of Proverbs," "Polyglot of Foreign Proverbs," &c. He edited the works of Addison and Lowndes's "Bibliographer's Manual," and prepared for the Philobiblon society a "Life of Shakespeare" and "Dictionary of English Poetical Quotations."

BOHOL, or Bool, one of the Philippine islands, situated between Cebu and Leyte, and N. of

Mindanao, lat. 9° 54′ N., lon. 124° 21′ E., discovered by Magellan in 1521. It is 46 m. in length from E. to W. and 32 m. in breadth; area estimated at 1,354 sq. m. It is watered by several small rivers, one of which has its rise in a lake in the interior. Gold is found in the river sands. The chief vegetable products are rice, cocoanuts, and cotton. Cattle-raising and the manufacture of cocoanut oil and of silk and coarse cotton fabrics are the principal occupations of the inhabitants.

BÖHTLINGK, Otto, a Russian orientalist, of German descent, born in St. Petersburg, May 30, 1815. He studied at Berlin and Bonn, and became a member of the St. Petersburg academy of sciences and councillor of state. He edited Vopadeva's grammar (St. Petersburg, 1846), Kalidasa's *Sakuntala* (with translation, Bonn, 1842), and Hematchandra's lexicon (St. Petersburg, 1847), and published a grammar and lexicon of the Yakut language (3 vols., 1849–'51), and "Indian Aphorisms" (*Indische Sprüche*, 2 vols., 1863–'4). His principal work is the great Sanskrit dictionary (*Sanskrit-Wörterbuch*), prepared conjointly with Prof. Rudolph Roth of Tübingen and published by the St. Petersburg academy (7 vols., 1853–'67).

BOHUN, Edmund, an English writer of the 17th century, born at Ringsfield, Suffolk. He was a descendant of the lords of the manor of Westhall, and was educated at Queen's college, Cambridge, which he entered in 1663. He edited Filmer's treatise on the origin of government, wrote an answer to the paper which Algernon Sidney had delivered to the sheriffs on the scaffold, and subsequently published a geographical dictionary and other works. He swore allegiance to William and Mary, though he was a stanch tory and had been a persecutor of nonconformists and a champion of the doctrine of passive obedience; and in 1692 he was appointed by the earl of Nottingham as licenser, in place of Fraser. He at once opposed the publication of "A History of the Bloody Assizes," and of other writings which he considered schismatic and revolutionary, but sanctioned that of an anonymous volume entitled "King William and Queen Mary Conquerors," which reflected his own peculiar views, but which roused public indignation chiefly by its title, and led in January, 1693, to his removal from office, to his arrest, and to the public burning of the obnoxious treatise. It was alleged that Charles Blount, an extreme whig, had written this book in order to lay a trap for the ruin of Bohun, whose censorship he had bitterly denounced. See "Autobiography of Edmund Bohun" in Dunton's "Life and Errors" (privately printed, London, 1853).

BOIARDO, or **Bojardo, Matteo Maria,** count of Scandiano, an Italian poet, born at Scandiano in 1430 or 1434, died in Reggio in December, 1494. After finishing his studies in the university of Ferrara, he was received with distinction at the court of the duke of Este in that city, and was appointed governor of Reggio in 1478, of Modena in 1481, and again of Reggio in 1487. His great chivalrous poem, which was left unfinished, *Orlando innamorato*, is divided into three books, containing 69 cantos. In 1545 this work had already passed through 16 editions, but the entire work was first printed in 1495. It was translated into French by Vincent in 1544, and subsequently by Rosset and Tressan, and Le Sage made an imitation of it. Boiardo wrote his poem in the Italian spoken in his time at the court of Ferrara, and it was therefore very much criticised at Florence. After various attempts to purify the style, it was more than once entirely rewritten; the best *rifaccimento* is that of Berni. This brought the poem into disuse, and Panizzi first published the primitive text, with a careful examination of the poem (London, 1830). Ariosto's *Orlando furioso* is a continuation of Boiardo's poem. Boiardo was the author of many other works, the most valuable of which are his *Sonnetti e canzoni* (3 vols., Reggio, 1499), almost all addressed to his mistress, Antonia Capraca. Among the others is *Il Timone*, a drama in five acts.

BOÏELDIEU, François Adrien, a French composer, born at Rouen, Dec. 15, 1775, died at Grosbois, near Bordeaux, Oct. 8, 1834. At an early age he was distinguished as a performer on the piano, for which he composed his first musical pieces. These were succeeded by duets for the harp and piano, and romances, remarkable for their simple and graceful melodies, several of which, as the *Ménestral* and *S'il est vrai que d'être deux*, became very popular. In 1797, two years after his arrival in Paris, he was appointed professor of the piano at the conservatoire, and produced at the opéra comique *La famille suisse*, which was succeeded by *Le calife de Bagdad*, *Ma tante Aurore*, and other works, revealing fertility of invention, and a freshness and vivacity in the melodies which have never been surpassed on the French stage. In 1803, at the invitation of the czar Alexander I., he went to St. Petersburg to fill the place of imperial chapelmaster. He returned to Paris in 1811, and soon after brought out a number of works, among which were *Jean de Paris*, *Les deux nuits*, *Le nouveau seigneur du village*, &c. In 1817 he was elected a member of the institute, soon after which appeared his *Chaperon rouge*, the gay and brilliant music of which fully justified the honor thus conferred upon him. In 1825 he produced *La dame blanche*, esteemed his *chef-d'œuvre*, which is still familiar to the English and American stage. An affection of the throat now compelled him to resign his professorship, but he was enabled to live comfortably on a pension from the conservatoire and an annual present from Charles X., until the revolution of July, 1830, deprived him of these sources of income. He was honored with a public funeral.

BOII, a Celtic people whose original seat appears to have been in that region now forming the French departments of Haute-Marne and

Haute-Saône, but who passed over into Cisalpine Gaul, by the Great St. Bernard or the pass of the Pennine Alps, probably with the current of Celtic immigration which began to set thither as early as the 5th century B. C. (See CELTS.) They crossed the Po, and established themselves south of that river, in the region forming the modern provinces of Modena, Bologna, and Ferrara. In the half-traditionary accounts of the period subsequent to this settlement, they are represented as aiding the Insubres and Senones in the sack of Melpum (probably about 396 B. C.). Their first conflict with the Romans appears to have been in 283, when they acted as allies of the Etruscans at their defeat near Lake Vadimonis. In 282 they were again defeated, and now kept a truce with Rome for 45 years. At the end of that time they again took up arms to resist Roman encroachments, played a prominent part in the Gallic war of 225, in which they suffered severe defeat, in the second Punic war (218), in which they were efficient allies of Hannibal, and in the revolt of the Gauls under Hamilcar (200). They did not cease hostilities, waged with or without the assistance of other tribes, until 191, when they were finally entirely subdued by Scipio Nasica, who punished them with the utmost severity, slaughtering nearly half their number. As a further means of putting an end to their power, the Romans established colonies in their territory, and finally compelled the remaining Boii to recross the Alps, and take refuge with the Celtic tribes of Pannonia. Near the W. border of this country they again established themselves, in the regions which took from them the names of Boioaria or Bavaria and Boiohemum or Bohemia. They remained here for more than a century, but their power had been broken, and they were at last entirely exterminated by the Dacian tribes. Little is known of their customs and political condition, but from the allusions of Livy they appear to have had towns and fortifications of some consequence, and to have known something of the mechanic arts.

BOIL, an inflamed tumor, which begins as a pimple in the skin, and continues to increase until it becomes as large as a walnut, or even larger. It is of a conical shape, somewhat red or dusky, and hard, with burning heat and pain. Between the fourth and eighth day it becomes very prominent, and begins to "point;" a speck of matter may be seen on the summit, which gradually softens; the skin at lasts bursts at that point, and matter mixed with blood is discharged through a small opening. A day or two after this, the core, which is supposed to be a portion of dead connective tissue, finds its way out, or may be forced out by gentle pressure, leaving an open cavity which soon fills up, and heals about the 12th or 14th day. Boils may appear on any part of the body, but they commonly form on the face or on the neck, in the armpits or inside of the thighs, on the hips or in the groin; and there are generally several, either at the same time or following one another. They seem to be caused by fatigue in some form, anxiety of mind, fatigue of the digestive organs, and general fatigue of body or of mind, or both. By lancing the pimple on its first appearance, the formation of the boil is often prevented. If allowed to mature and go on to suppuration, the pain may be relieved and the process hastened by the application of warm poultices. The period of suppuration may be distinguished by the pain, which becomes more severe and throbbing in character, by an œdematous condition of the skin over its most prominent portion, and by a sense of deep-seated fluctuation communicated to the fingers, when the tumor is compressed alternately from side to side. As soon as the formation of pus is indicated by the above signs, the most effectual treatment, both for the relief of pain and for the rapidity of cure, is to make a free incision into the substance of the boil, deep enough to reach its central cavity and allow the evacuations of the pus. When the boil is allowed to burst of itself, the opening is usually small, and the core remains some time before it is discharged, unless it be drawn out. The cavity soon heals after the core is discharged, and nothing is usually required but simple dressing.

BOILEAU-DESPRÉAUX, Nicolas, a French didactic and satirical poet and critic, born in or near Paris, Nov. 1, 1636, died there, March 13, 1711. His mother, Anne de Nielle, who died in his infancy, was the second wife of Gilles Boileau, an esteemed greffier of the Paris parliament, who claimed descent from Étienne Boileau or Boilesve, a provost of the 13th century. Young Boileau, whose surname of Despréaux is ascribed by some authorities to a small patch of land which he owned, studied law and theology, was admitted as an advocate, and received the tonsure; but, despite the remonstrances of his relatives and the limited means bequeathed to him by his father, who died in 1651, he devoted himself to literary pursuits, and especially to satirical poems, in which he took Horace as his model. Some of them were circulated in MS. in 1660, and gained for him access to the hôtel de Rambouillet, where the prevailing pedantry confirmed his purpose of refining literary taste. His *Discours au roi* and other satires, first published in 1666, established his reputation, and he became the highest literary authority, whose decisions made all pretentious mediocrities wince, while Corneille found in him a judicious admirer, and Molière, Lafontaine, and Racine a discriminating mentor. His numerous enemies prevented his presentation at court till 1669; but thenceforward he was the principal literary favorite of Louis XIV., whom with Racine he accompanied in his campaigns nominally as historiographer, receiving a large salary without performing any duty beyond the composition of complimentary verses. With his increasing prestige, his writings became more serene and

philosophical, although he continued to use satire as a potential engine of reform. The French academy, though incensed at his bold criticisms, could not exclude him beyond 1684; and with Racine he also became one of the earliest members of the academy of medals (afterward of inscriptions). Louis XIV. presented him with a fine residence at Auteuil, where the choicest spirits of France delighted in Boileau's conversation, the sting of his satire being smoothed over by his kindly nature. According to Mme. de Sévigné, he was cruel only in writing. He was tenderly devoted to Molière, Racine, and Lafontaine, though often unsparing in his criticism of their works, and successfully exerted his influence with Louis XIV. for restoring a pension to the aged Corneille. At a later period Mme. de Maintenon took umbrage at his disparaging remarks on Scarron in the presence of Louis XIV.; and ultramontane influence also working against him, he forfeited the favor of the monarch and his court, which he ceased to frequent after the death of Racine (1699), the king having received him on his announcement of this event with marked coldness. Subsequently he was prohibited from publishing his 12th satire, *De l'équivoque*. In his disappointment he sold his house at Auteuil and ended his life in Paris in sadness, which was increased by his infirmities. He first resided in a cloister of Notre Dame, and finally, according to the latest researches, in the rue de Jérusalem, and not as previously stated in a village near Paris.—His greatest work is *L'art poétique* (1674), a didactic poem, establishing a new system of poetical and dramatic composition; and the first four cantos of *Le lutrin* (1674), a heroico-comic poem, were admired as gems of fancy and humor. Many of his didactic *Épîtres* also acquired celebrity, and his other productions include *Satires*, *Épigrammes*, *Dialogues de la poèsie, de la musique et des héros de roman*, and an annotated translation of the treatise on the sublime by Longinus. Guided solely by his judgment and his fine perceptions of the true and the beautiful, he was wrongly represented by those whose pedantry he denounced as destitute of all emotional powers. Voltaire characterized him as the legislator of Parnassus, and his reputation as the founder of a new school of criticism and composition has survived all the changes in French literature, as attested by Sainte-Beuve and other recent authorities. Among the best editions of his works are those by Daunou (3 vols., Paris, 1809; 4 vols., 1825); by Saint-Surin, with copious notes (4 vols., 1824); and by Berriat Saint-Prix (4 vols., 1830; new ed., 1860, with an essay by Sainte-Beuve). Auguste Laverdet has published a complete edition of Boileau's *Correspondance* (2 vols., 1856).

BOILING POINT, the temperature at which a liquid is converted into vapor with ebullition. It varies with the nature of the liquid and with the degree of pressure upon it, but it is ordinarily understood to mean that temperature at which the boiling occurs when the surface of the liquid is exposed to an atmospheric pressure equal to maintaining a column of mercury 29·922 inches in height. It is, consequently, the point at which the tension of the vapor is equal to the pressure upon the liquid. During the boiling of a liquid in the open air, therefore, the temperature remains constant, even when the amount of heat supplied to the liquid is increased. The additional heat, instead of being retained, is expended in converting an increased quantity of the liquid into vapor. If pure water is boiled in an open metallic vessel when the barometer stands at 29·922 inches, it will be observed that the ebullition takes place and continues, for a long time at least, at 212° F. If we substitute alcohol for water, ebullition will commence at 173°; and if sulphuric ether is used, its boiling point will be found at 95°, a temperature below that of the human body. There are several bodies which at ordinary temperatures are gases, but which by the abstraction of heat or subjection to pressure, or both, may be reduced to liquids, whose boiling points are therefore below the ordinary temperature of the atmosphere. The following table gives the boiling points of several of both these classes of bodies, and also the atmospheric pressure at which the observations were made, and the authority:

NAME.	Boiling point, F.	Height of barometer.	OBSERVER.
Nitrous oxide	—126·22°	29·882	Regnault.
Carbonic acid	—108·76	30·209	"
Ammonia	— 28·66	29·498	Bunsen.
Sulphurous acid	13·10	29·291	"
Chloride of ethyl	51·80	29·843	Pierre.
Aldehyde	67·64	28·898	Kopp.
Sulphuric ether	93·56	29·214	"
Sulphide of carbon	118·22	29·756	Pierre.
Bromine	145·40	29·922	"
Alcohol	173·32	29·922	Gay-Lussac.
Water	212·00	29·922	Kopp.
Acetic acid	242·42	29·528	"
Sulphuric acid	640·00	29·922	Marignac.
Mercury	662·00	29·922	Regnault.

It will be observed that the first four of the bodies in the above table are gases at temperatures below the freezing point of water, one of them passing into the liquid state only at 126·22° F. below zero.—The following method for ascertaining the boiling points of liquids is recommended by Prof. Kopp, and is particularly applicable to cases where the liquid is expensive, or where only a small quantity can be obtained. A small test tube is fitted with a cork through which are bored two small holes. Through one of these a delicate thermometer is passed, and through the other a bent glass tube, open at both ends. A few scraps of recently heated platinum foil are placed in the test tube, and then the liquid, only a small quantity of which is required, is poured in. The scraps of platinum foil are for the purpose of furnishing starting points for the formation of the steam bubbles. The bulb of the thermometer is usually placed in

the vapor immediately above the liquid. A spirit lamp will quickly cause ebullition, the steam passing off through the open glass into a cooled receiver.

Fig. 1.

(See fig. 1.)—Water has been the subject of very careful experiments with regard to its boiling point. In consequence of the diminution of the weight of the atmosphere as we ascend to high mountain altitudes, the boiling point of water becomes so low that food cannot be cooked in it. Darwin, who ascended one of the mountains of Patagonia, was unable to cook potatoes by boiling, and various travellers have ascended heights where it was impossible to boil eggs. At the city of Mexico, which is 7,000 ft. above the level of the sea, water boils at 200° F.; at Quito, which has an elevation of 9,000 ft., it boils at 194°; and at a height of 18,000 ft. in the Himalaya mountains Dr. Hooker found the boiling point to be 180°. In mines below the level of the sea water will not boil till it is raised to a temperature above 212° F. When the barometer marks 28·2 inches ebullition commences at 209°, so that the time required to cook food by boiling, even in the same locality, will often vary considerably. The boiling point of water under various degrees of atmospheric pressure, and consequently at various mountain altitudes, may be readily obtained by placing a vessel of warm water containing a thermometer under the receiver of an air pump, through the top of which has been introduced a barometer. (See fig. 2.) If the water in the vessel has been raised to 212° just before being placed under the receiver, it will require but a stroke of the piston of the air pump to produce ebullition. By continuing the exhaustion the boiling may be rendered very violent, and then the mercury in the thermometer will be observed to fall very rapidly. The conversion of the water into vapor causes the conversion of sensible into latent heat, a term which is still retained, although modern theory regards it as being converted into mechanical force. When the water boils at 186° F., the column of mercury in the barometer will stand at about 17·5 inches, or about the same as at the summit of Mont Blanc, at an altitude of about 15,700 ft. above the level of the sea. By using a large pump and a small receiver, which may be quickly exhausted, and also a small quantity of water, placed in a test tube or a vessel of that form, and some strong sulphuric acid or chloride of calcium, for absorbing moisture, ebullition may be produced at a temperature as low as 45° F., or even lower. If it were possible to produce a perfect vacuum, it could be continued till the freezing point is reached; but the circumstances of the case prevent it. An apparatus like that represented in fig. 3 will serve to exhibit the effect of increased pressure on the boiling point. A small iron boiler, *a*, having a thermometer, *b*, tightly adjusted, with the bulb passing to the interior, and furnished with a stopcock, *c*, receives at its mouth, *d*, a strong glass tube open at both ends, and sufficiently long to contain a column of mercury equal to the pressure it may be desired to produce. To the mouth a screw, through which the tube passes to near the bottom, is securely fitted. To make the experiment some mercury is poured into the boiler, and then it is about half filled with water, the bulb of the thermometer being left a little above the level. If now heat be applied while the stopcock is left open, the water will commence and continue to boil at 212° F.; but when the stopcock is closed the increased pressure produced by the confined steam will prevent ebullition unless the temperature is raised. When the mercury has been forced up the tube to a height of 30 inches, there will of course be a pressure of two atmospheres upon the surface of the water, the boiling point of which will be raised to 249°. If the heat be increased until the column attains a height of 90 inches, the pressure will be equal to four atmospheres, and the boiling point will be raised to 291°. Regnault, in his celebrated experiments, used a stronger and more complex apparatus than this, and found that at a pressure of 20 atmospheres the boiling point of water was 415·4° F. From the foregoing considerations it will be seen that a perpendicular column of water will have various boiling points at different depths. Thus, if a column of water is 34 ft. in height, the particles at the bottom will sustain a pressure of two atmospheres, and it will require the application of 249° of heat to produce ebullition at that point, and of 234° at half the depth. When steam bubbles, having a temperature much above 212°, ascend through a column of liquid in a tall cylinder, they impart their excess of heat to it, and violent bursts of steam and boiling water are thrown from the mouth of the ves-

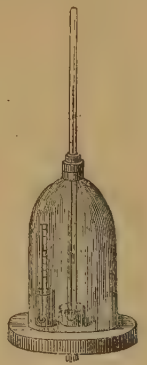


Fig. 2.

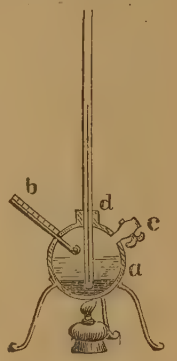


Fig. 3.

sel. If a basin is placed about the orifice to catch the falling liquid, which in the presence of the expanding vapor has parted with much of its heat, and convey it back again to the cylinder, a period of comparative quiet will follow. During this time the temperature of the column will increase, and bubbles of steam will rise higher and higher, until at last, when they have attained sufficient force, the violent expulsion of steam and water will be repeated. The geysers in Iceland, and the great American geysers at the head waters of the Missouri river, are examples in nature of the boiling of water in vertical tubes.—There are some circumstances attending the boiling of water besides external pressure which must be taken into consideration in making experiments, or correct results will not be reached. If water is boiled in a well cleaned glass flask which is perfectly smooth inside, it will, when the barometer stands at 29·922 inches, reach a temperature of 214°. If the flask had been rinsed with a solution of potash, the boiling might not have occurred below 215° or 216°. The reason assigned for these phenomena is that the perfect cleaning of the glass in one case, and the presence of a small quantity of potash in the other, increases the cohesion of the water and glass to such a degree as to demand an increase of heat to effect a separation between them. If water be boiled for a long time in a flask, and not in a vessel where the surface is freely exposed to the air, it will be observed, especially if the heat is moderately applied to the centre of the bottom, that the ebullition becomes more or less irregular or jerking. If the water is allowed to cease boiling for a few moments, and the heat is carefully applied, the temperature may be raised as high as 220° before any bubbles of steam will be formed, when the boiling will take place with a sudden leap, accompanied by a rapid decrease of temperature; then there will be another period of quietude, succeeded by another violent evolution of vapor. These effects are heightened, if instead of using an open flask the water is boiled in a partial vacuum of its own vapor. This may be done by removing the lamp and corking the neck of the flask after the air has been as far as possible expelled. If we now turn cold water over the flask, the vapor within will be partially condensed, and the boiling will recommence and will continue even if the flask be plunged into cold water, until its temperature is reduced much below blood heat, and indeed as long as the tension of the vapor above the water can be kept below the tension of the vapor which the water is capable of yielding. Near the conclusion the ebullition becomes very irregular and jerking; and if the flask is placed in a retort stand and gently heated at the bottom, the bursts of vapor will be more explosive than during the cooling process, and sometimes the flask will be thrown from the stand. The explanation which is generally received is this: Water in its natural state contains a considerable quantity of atmospheric air. Boiling expels a portion, but not all of it, unless it has continued a long time. While this expulsion of air is taking place, if only in exceedingly small quantities, little bubbles of it are formed into which the steam can enter and expand; but when the air is all expelled, the molecules of water will not separate from each other as readily as they passed into the air chambers. It seems as if there needed to be an opening or a point of diminished pressure somewhere in order that the particles of water at 212° F. may expand into vapor. Dufour has very carefully studied this subject. In experimenting with water he used a mixture of oil of cloves and linseed oil, which had been previously heated to 390° F. and allowed to cool. The water, heated to 170°, was carefully dropped in so as not to disturb the film of oil which coated the bottom of the vessel, and the temperature was gradually raised. The boiling point would invariably be passed and a heat of 230° or 236° reached before any manifestation of ebullition could take place. Then an explosion would occur and the remainder of the globule of water would be violently driven to one side. He succeeded in raising some small globules to 347° F., a temperature which would cause water with an exposed surface to boil under a pressure of more than eight atmospheres. The passage of sparks from a Leyden jar would produce violent explosions; so also would a weak galvanic current, but in a less degree. In the latter case Dufour attributed the effect to the production of bubbles of gas at the ends of the conducting wires. He also found that when the surface of water was covered with a thin film of oil its temperature could be raised considerably above the boiling point. The investigations of Prof. Donny of Ghent, who has succeeded in raising water far above its boiling point when not enclosed in oil or other substances, have added much to the stock of knowledge on the subject. Prof. Kopp and others have extended researches to various other liquids, and have found that many of them also possess the property of being raised under certain circumstances several degrees above their boiling points. Thus, methylic alcohol, whose boiling point is 141·8° F., may be raised by changing the nature of the vessel to 152°. In estimating the boiling point of a liquid Dufour very sensibly suggests that we should take the lowest temperature at which a liquid can be made to boil under the proper conditions. That an examination of this subject in relation to the cause of steam-boiler explosions would lead to important improvements is most probable. That the temperature of the water in the boiler of a steam engine may be raised considerably above the boiling point is very possible, as for instance when the engine has been standing quiet for some time, and the water has been deprived of most of its air. Under such circumstances a disturbance of rest would cause an explosive burst of vapor, pro-

portional to the temperature the water had attained. The presence of various salts in solution affects the boiling to a very great degree, but there has not been found much accordance between the solubility of the salts and the extent of their influence.

TABLE OF BOILING POINTS OF SATURATED SOLUTIONS.

NAME OF SALT.	Parts in 100 of water.	Boiling point, F.
Acetate of potassium	792·2	336·2°
Nitrate of calcium	362·2	303·8
Nitrate of potassium	335·1	240·6
Nitrate of sodium	224·8	249·8
Acetate of sodium	209·0	255·9
Carbonate of potassium	205·0	275·0
Chloride of ammonium	88·9	237·6
Tartrate of potassium	296·2	238·5
Chloride of sodium	41·2	223·5
Carbonate of sodium	48·5	220·3

It has been a subject of controversy whether the vapors which issue from boiling aqueous solutions are of a higher temperature than the boiling point of pure water. According to the recent experiments of Prof. Magnus of Berlin the bubbles have at the moment of issuing a temperature equal to that of the highest stratum of the liquid; but it is almost instantaneously reduced by the absorption of heat occasioned by the expansion of the vapor.—All the observations that have been made fail to establish any relation between the boiling points of liquids and their specific gravities. Thus, bromine, with a specific gravity of 3·1862, boils at 145·4° F., while bromide of silicon, with a specific gravity of 2·8128, has a boiling point of 308°; and formic ether, having a specific gravity of ·9357, boils at 127·7°, while fusel oil, with a specific gravity of only ·8271, does not boil below a temperature of 269·8. The chemical constitution of many liquids, however, according to the investigations of Prof. Kopp, bears a very striking relation to their respective boiling points. He found that analogous compounds, having the same differences of composition, often have the same differences in their boiling points. Thus, in the series of homologous acids which differ in composition by one molecule of CH_2, and the alcohols from which they are derived by oxidation, he found that there was a difference of very nearly 34·2° F. in the boiling points. In the following table, which exhibits some of Kopp's results, it will moreover be observed that the difference in boiling points between each alcohol and its derived acid is very nearly 72° F.

BOILING POINTS OF ALCOHOLS.

ALCOHOL.	Formula.	Calculated boiling point, F.	Observed boiling point, F.
Methylic alcohol	CH_4O	138·2°	Kane, 140°; Kopp, 149°; Pierre, 150·8°.
Ethylic alcohol	C_2H_6O	172·4	Dumas, 168·8°; Gay-Lussac, Kopp, 172·4°.
Tritylic alcohol	C_3H_8O	206·6	Chancel, 204·8°.
Tetrylic alcohol	$C_4H_{10}O$	240·8	Wurtz, 228·2°.
Amylic alcohol	$C_5H_{12}O$	275·0	Pierre, Kopp, 269·6°; Reickher, 275°.

BOILING POINTS OF ACIDS.

ACID.	Formula.	Calculated boiling point, F.	Observed boiling point, F.
Formic acid	CH_2O_2	210·2°	Liebig, 210·2°; Kopp, 221°.
Acetic acid	$C_2H_4O_2$	244·4	Kopp, 242·6°; Sebille, Auger, 246·2°.
Propionic acid	$C_3H_6O_2$	278·6	Dumas, Leblanc, 284°; Kopp, 287·6°.
Butyric acid	$C_4H_8O_2$	312·8	Kopp, Delffs, 312·8°; Pierre, 325·4°.
Valeric acid	$C_5H_{10}O_2$	347·0	Dumas, Delffs, 347°; Kopp, 343·8°.

It was found that in the series of hydrocarbons homologous with benzole, C_6H_6, a difference of CH_2 in chemical composition is accompanied with an average difference of about 43° F. in the boiling point; and in the series of alcohol radicles homologous with ethyl the difference in the corresponding boiling points was observed to be about the same.

BOISARD. I. Jean Jacques François Marie, a French fabulist, born at Caen in 1743, died there in 1831. He was secretary to the count de Provence, afterward Louis XVIII. Losing his pension at the revolution, and unable to find employment in Paris, he spent the rest of his life at Caen, in great poverty. His *Mille et une fables* (2 vols., 1777) are regarded as equal to those of Florian, and in some respects to those of Lafontaine. A new edition of them was published at Caen in 1806. **II. Jacques François,** a nephew of the preceding, born at Caen about 1762, died in the first half of this century. He was not successful as a painter, and not much more so as a fabulist, though he wrote many volumes, some of which (*Fables*, 2 vols., Paris, 1817–'22) he dedicated to Louis XVIII. He was sentenced to be guillotined in 1793, but escaped. He spent most of his life in poverty.

BOISÉ, a S. W. county of Idaho, watered by the Little Salmon river and affluents of the Saptin or Snake river; area, about 2,500 sq. m.; pop. in 1870, 3,834, of whom 1,754 were Chinese. The county contains 5 quartz mills for the production of gold, 8 saw mills, and a weekly newspaper. Capital, Idaho City.

BOISÉ CITY, the capital of Idaho territory and of Ada county, situated on the N. bank of the Boisé river, about 520 m. N. E. of San Francisco, and 285 m. N. W. of Salt Lake City,

in the S. E. part of the county; pop. in 1870, 995. It contains a penitentiary, a U. S. assay office, a national bank, 3 grist mills, and 3 newspapers. It is reached in two days by stage from Indian Creek, Utah, on the Central Pacific railroad. The place was formerly a trading post of the Hudson Bay fur company; it now commands the trade of the miners on the W. slope of the Rocky mountains, and of the surrounding agricultural country.

BOIS-LE-DUC (Dutch, *'sHertogenbosch*, the duke's wood, or *Den Bosch*), a fortified city of Holland, capital of North Brabant, at the junction of the Dommel and the Aa, which here form the Dieze, 27 m. S. by E. of Utrecht; pop. in 1868, 25,038. The town is 5 m. in circumference, handsome and well built, and traversed by several canals, crossed by upward of 80 bridges. It is the seat of a Roman Catholic bishop, and has a handsome town hall, eight churches, including a fine Gothic cathedral, an orphan asylum, prison, two hospitals, a citadel, two forts, barracks for 3,000 men, an academy of painting, sculpture, and architecture, and manufactures of thread, ribbons, cutlery, and glass. Bois-le-Duc was founded by Godfrey III., duke of Brabant, in 1184, on the site of a hunting seat, whence the name. The city was taken from the Spaniards by Prince Frederick Henry of Orange, after a severe siege, in 1629, by the French under Pichegru in 1794, and by the Prussians in 1814.

BOISSIEU, Jean Jacques de, a French engraver, born in Lyons, Nov. 29, 1736, died there, March 1, 1810. He first devoted himself to painting; but his health having suffered by the preparation of colors, he turned to engraving and etching. He was a friend of Joseph Vernet, and in his own line had no rival. His etchings, which are either original compositions or copies of Flemish pictures, may be ranked next to those of Rembrandt.

BOISSY, Hilaire Étienne Octave Rouillé, marquis de, a French politician, born in Paris, March 4, 1798, died there, Sept. 26, 1866. He was a member of an ancient and opulent family, served as secretary of legation in London under Chateaubriand, and in 1839 entered the chamber of peers, where his continued altercations with its president, the duke de Pasquier, and his eccentric invectives, acquired for him much notoriety. His exposure of political scandals caused him to be invited to the political banquet in Paris which preceded the downfall of Louis Philippe; but by opposing the extreme revolutionists he lost his chance for an election to the constituent and legislative assemblies. In 1853 he became a member of the imperial senate, where he became conspicuous for his bitter and occasionally brilliant speeches, and his animosity against the ultra liberals of 1848. He married in 1851 Lord Byron's former mistress, the countess Guiccioli.

BOISSY D'ANGLAS, François Antoine de, a French statesman, born at St. Jean Chambre, Dec. 8, 1756, died in Paris, Oct. 20, 1826. His family were Protestant, and had destined him to the bar; but having purchased the place of steward to the count of Provence, afterward Louis XVIII., he devoted his leisure to literary pursuits. He was chosen a member of the states general and of the convention. In the latter he for the most part sided with the Girondists. He voted for the trial of Louis XVI., for his captivity, and for his deportation, and, when extreme measures were determined upon, for an appeal to the people in his behalf, and for the postponement of his execution. These evidences of moderation rendered him obnoxious to the committee of public safety, and throughout the reign of terror he kept himself in the background; but on the downfall of Robespierre he reappeared at the tribune. He was chosen secretary of the convention, Oct. 7, 1794, and two months later a member of the committee of public safety. While superintending the provisioning of Paris, he was denounced by the populace as having caused the scarcity of bread which prevailed. In the dreadful insurrections of April 1 and May 20, 1795, his situation was exceedingly difficult and dangerous, yet he acted with firmness and judgment. He presided over the tumultuous deliberations of the convention with like intrepidity. After the convention passed away, he was a member of the council of 500, and subsequently president. Being hostile to the directory, he he was accused, Sept. 5, 1797, of corresponding with the royalist club of Clichy, and condemned to deportation. For two years he was concealed, but at last surrendered himself a prisoner at the island of Oléron. Bonaparte released him, and in 1800 named him to the tribunate, where he was chosen president in 1803. The following year he became a member of the senate, with the title of count. On the restoration of the Bourbons in 1814, he gave in his adhesion to the new government, and was made a peer of France. He was the author of an *Essai sur la vie, les écrits et les opinions de M. de Malesherbes* (2 vols. 8vo, Paris, 1819–'21), and of *Études littéraires et poétiques d'un vieillard* (5 vols. 12mo, 1825).

BOISTE, Pierre Claude Victoire, a French lexicographer, born in Paris in 1765, died at Ivry, April 24, 1824. He was successively an advocate, printer, and man of letters, and composed a *Dictionnaire universel de la langue française*, a work of great merit, and deserving the popularity which it immediately obtained. It appeared in 1800, and passed through six editions during the lifetime of the author. To each edition the author added some new feature, first the etymologies, then the original authorities, finally sentences and maxims, or select thoughts, where each word is employed. He published also a *Dictionnaire de géographie universelle ancienne et moderne* (1806), and several works on the principles of grammar and literature.

BOIVIN, Marie Anne Victoire Gillain, a French midwife, born near Paris, April 9, 1773, died

May 16, 1841. She was educated in a nunnery, where by her talents she attracted the attention of the sister of Louis XVI., Madame Elisabeth. The nunnery was destroyed in the revolution, and she then spent three years in the study of anatomy and midwifery. In 1797 she married an employee at Versailles named Boivin, and on being left after a short time a widow with a child and without fortune, she undertook the office of midwife at the Maternité hospital, and in 1801 was appointed chief superintendent of the institution, to which at her suggestion a special school of accouchement was added by Chaptal. The order of civil merit was conferred upon her by the king of Prussia in 1814, and she received the degree of M. D. from the university of Marburg. Her *Mémorial de l'art des accouchements*, published in 1824, passed through many editions.

BOJADOR, Cape, a lofty headland of W. Africa, in lat. 26° 7′ N., lon. 14° 23′ W. This cape is mountainous and rocky, being the western termination of the Black mountains, which extend eastward into the interior of Sahara, and as far northward as Cape Nun. The coast is very dangerous, being perpetually shrouded in mists, and strong currents setting in toward the land. For many years it interrupted the progress of the early Portuguese navigators, but was finally passed by Gilianes in 1433.

BOKER, George Henry, an American dramatist and poet, born in Philadelphia in 1824. He graduated at Princeton college in 1842, studied law, but did not pursue the profession, and in 1847 published the "Lesson of Life and other Poems." Next he wrote "Calaynos, a Tragedy," which at once extended his reputation, and was successfully played in London. His next production was "Anne Boleyn," which was succeeded by the tragedies of "Leonor de Guzman" and "Francesca da Rimini." He published two volumes of "Plays and Poems" at Boston in 1856, and during the civil war produced many patriotic poems, which were collected in one volume entitled "Poems of the War" (Boston, 1864). He was appointed minister resident at Constantinople in 1871.

BOKHARA. I. A khanate of Independent Turkistan, central Asia, between lat. 36° and 43° N., and lon. 62° 30′ and 69° 30′ E.; bounded N. by the desert of Kizil Koom, N. E. and E. by Russian Turkistan, Khokan, and Koondooz, S. by Balkh, Maimana, and Afghanistan, and W. by Khiva; area, about 100,000 sq. m.; pop. roughly estimated at 2,500,000. The western parts, with the exception of the banks of the Jihoon, which are lined with luxuriant vegetation, present the appearance of a vast desert similar to those of Arabia, devoid of all animals, and subject to the *tebbad*, a hot dry wind, which sweeps swiftly across the arid plains, and if overtaking a caravan overwhelms both men and animals, and not unfrequently proves fatal. The eastern part of the khanate, which is hilly and watered by affluents of the Jihoon and the Zerafshan or Kohik, is more fertile. Spurs of the Paropamisan range in the southeast give rise to a number of streams. The three principal rivers, along which lies nearly all the cultivated land, are the Jihoon or Amoo Darya (the ancient Oxus), which flows N. W. through the centre of the country; the Zerafshan, flowing W. from the now Russian territory of Samarcand to and past the city of Bokhara, and dividing into several channels, which with artificial irrigating canals form a network of streams rendering the district exceedingly fertile; and the Shehrizebz, between the Zerafshan and the Jihoon. The last two terminate in small salt lakes or are lost in the sand. The cultivated land is divided into squares with boundaries marked by ridges of turf raised slightly above the level of the plain. The water from the rivers and canals flows through trenches, which, as well

Lady and Gentleman of Bokhara.

as the narrow roads of the farm lands, are lined with trees. The climate is temperate, the summer beginning in March and lasting till October. During this season no rain falls, and the thermometer rises to 90° in the day, but the nights are cool. October and February are the rainy seasons. The winters are open, though sometimes the snow covers the ground for a fortnight, and in January, the coldest month, the mercury falls as low as 6°. The more violent storms come usually from the northwest. They are often accompanied with clouds of sand and dust which render ophthalmia frequent, but otherwise the climatic influences are healthy. The principal vegetable productions are wheat, barley, millet, rice, sesame, hemp, tobacco, pulse, tropical fruits and vegetables, a species of indigo plant, manna, cotton, and silk. Bang, an intoxicating drug, is made from hemp seeds. Gold is found in

the rivers, salt is obtained from the small lakes, and sulphur and sal ammoniac are also found. Timber is brought from the mountains, but on the plains only willow and poplar are found. The wild animals of Bokhara are bears, wolves, foxes, jackals, wild asses, hares, and antelopes. The domestic animals are horses, camels, dromedaries, asses, oxen, sheep, and goats. The sheep are of the fat-tailed breed, and there is a peculiar species with a jet-black curly fleece; lamb skins are exported to Persia. The goats of Bokhara are a variety of the Thibetan and Cashmere breed, and yield a fine shawl hair. The population of Bokhara is composed of different nations, Uzbecks, Tajiks, Turkomans, Afghans, Kirghiz, Arabs (the descendants of the Mohammedan conquerors), Kalmucks, Hindoos, and Jews. The Tajiks are supposed to be the most ancient inhabitants, and are said to resemble the Caucasian type most nearly; they have a large portion of the trade and manufactures in their hands. The Uzbecks lead mostly a nomadic life, and are noted for their hospitality to strangers. The Persians are nearly all either slaves who have been kidnapped by the Turkomans and sold here, or such as have purchased their freedom; they enliven trade, enter the government service, and several of them occupy the highest positions in the state. The Jews here as in the adjoining countries are the persecuted race, emigration even being forbidden them. The Turkomans roam over the country with their flocks and herds, plundering and kidnapping persons on the frontiers and selling them into slavery in the interior. Turkic dialects are spoken by most of the inhabitants. The prevailing religion is the Mohammedan. A considerable trade is carried on with foreign countries by means of caravans, though the extortionate customs dues in Bokhara, as in the neighboring states traversed by the caravans, and the predatory habits of the Turkomans tend to cripple it. The imports from Russia are muslins, leather, metals, dyes, and paper; from Afghanistan and India, English manufactures, Cashmere shawls, and sugar; from China, tea and porcelain. The exports are rhubarb, cotton, skins, raw and manufactured silk, camel's and goat's hair, fresh and preserved fruits, and shawl goods.—The government is a military despotism. At its head stands the emir as commander-in-chief, prince, and chief of religion. Under him are the vizier, the *mehter desturkhanjé* (steward), and *zekialtchi* (receiver of customs). The military and other civil dignitaries are divided into three classes, the *kette sipahi* (higher functionaries, comprising the secretary of state), the *orta sipahi* (the middle functionaries), and the *ashaghi sipahi* (subalterns). The administrative divisions of the country are based upon the larger cities, and include at present Karakul, Bokhara, Karshi, Tchardyui, and Shehrizebz. The last named, owing to its continual struggles with the khan, is not at all times wholly subject to him. Each division has a governor, who is allowed as his salary a fixed share of the revenue of the district.—The country was little known to the ancients, and the greater part of it was included under the general name of Transoxiana or Sogdiana. The conquests of the Mohammedans extended to the foot of the Bolor Tagh, and to them Bokhara, in its former and wider extent, was known as the Mawar-al-Nahr, and became famous for its great seminaries of learning at Samarcand, Balkh, and Bokhara. Even in modern times these cities, of which only the last now belongs to the khanate, enjoy a considerable reputation for their schools. For several centuries before the conquest by Genghis Khan, about 1220, Bokhara was regarded as belonging to Persia; but subsequently, and chiefly after the invasion by the Mongols under Tamerlane in 1370, the Persian element gave way to that of the Uzbecks, and Tamerlane intended to make Samarcand his capital. At the close of the 15th century his descendants were driven from power by the house of the Sheibani. The ablest of these was Abdullah Khan, born in 1533, who conquered Badakhshan, Herat, and Meshed. His son was unable to maintain his throne, and was assassinated in 1597. The overthrown dynasty was succeeded by that of the Astrakhanides (descendants of Genghis Khan), who remained in power till 1737. Ebul Feiz, the last of this dynasty, was murdered by Rehim Khan, who ruled with independent authority, but under the title of vizier. Upon his death the government was seized by Daniel Beg, to whom succeeded the emirs Shah Murad, Said Khan, and Nasrullah Khan. The last of these is known by the wars which he waged with Khokan, and by his barbarous treatment of several European travellers. In 1838 the British ambassador to Persia sent Col. Stoddart to Bokhara, to assure the emir of the friendly feeling entertained toward him by England. Nasrullah, enraged at receiving no reply to letters which he had sent to the queen, threw Stoddart into prison. Capt. Conolly, who was sent on a like errand, met the same fate, and both were put to death in 1842 on charge of being spies. Since then few Europeans have visited Bokhara. The missionary Wolf went there in 1843, and brought back tidings of the fate of Stoddart and Conolly. In 1841 a Russian expedition, consisting of Col. Bateneff, Lieut. Bogoslovsky, the geographer Khanikoff, and the naturalist Lehmann, visited Bokhara at the request of the emir; the last two published accounts of their journey (Khanikoff, "Description of the Khanate of Bokhara," in Russian, St. Petersburg, 1843; translated into English by Bode, London, 1845; Lehmann, *Reise nach Bokhara und Samarkand*, St. Petersburg, 1855). In 1863 three Italians, Gavazzi, Litta, and Meazza, went there in order to procure eggs of the silkworm. They were imprisoned, but were released after a year through the intervention of the Russian

government. In the same year Vámbéry, a Hungarian scholar, disguised as a wandering dervish, traversed a great part of Turkistan. His two works, "Travels in Central Asia" (London and New York, 1865), and "Sketches from Central Asia" (1867), furnish the most valuable information respecting Bokhara, and its relations to the other khanates. (See KHOKAN.) In 1850 the Russians established themselves at the mouth of the Sir Darya, on the sea of Aral, and began to push southeastward along the course of that river. They overran Khokan, and in 1865 annexed the northern part, while the remainder was formed into an independent khanate under the protection of Russia. Mozaffar Eddin, who had succeeded Nasrullah, attacked this khanate in 1866, and was defeated by the Russians, who took possession of the whole region of the Sir Darya. A treaty was entered into in November, 1867; but hostilities broke out again in the following spring. The Russians took Samarcand, and moved toward the city of Bokhara. The eldest son of the emir raised an insurrection against his father, and Mozaffar Eddin threw himself upon the protection of the Russians, ceded to them Samarcand and the adjacent territory, promised to pay an annual tribute, and virtually became a dependant of Russia. In 1868 the emir became engaged in hostilities with Cabool, and by Russian aid gained the region as far south as the Jihoon, which in 1869 was established as the boundary between Bokhara and Afghanistan. In 1870 the fanatical princes of Shehrizebz made an incursion into the Russian territory, but were defeated. Instead of taking possession of Shehrizebz, the Russians made it over to the emir of Bokhara. The emir has a standing army of 40,000 cavalry, which in case of need can be increased to 60,000. **II.** A city, capital of the khanate, on a branch of the Zerafshan, in lat. 39° 45′ N., lon. 64° 25′ E., 430 m. N. W. of Cabool; pop. about 70,000. It is surrounded by a wall pierced by 11 gates, and is divided into two parts, the inner and the outer city, which again are subdivided into quarters. It contains upward of 100 mosques, and about 80 medreses or colleges. The instruction given in these institutions is upon the Koran and religious casuistry, and there are a few books on logic and philosophy. Poetry and history are regarded as frivolous subjects of study, and even disgraceful. The number of students is represented at 5,000 from different parts of the khanate and the bordering states, India, China, and Russia. The poorer students have a yearly pension from the emir. The streets are narrow and tortuous, and the houses built chiefly of brick or mud with flat roofs; glass is unknown except in the form of beads or other ornaments, and the windows are furnished only with wooden shutters. The bazaars are mostly of wood, with mats stretched across; very few are of stone. The emir resides in the citadel, which is defended by a few old brass pieces. The supply of water is scanty. A disease called the *Rishte* is peculiar to Bokhara, and is attributed to the bad quality of the water. It consists of a boil from which issues a long worm like a thread. This is carefully extracted, and sometimes the whole infected place is cut out. In either case it leaves a hideous scar, completely disfiguring the person if attacked in the face. The favorite and universal beverage is tea, of which there are several excellent kinds superior in flavor and quality to those in western markets. European cotton and woollen stuffs, cutlery, beads, &c., find their way into Bokhara through the medium of Persian traders and dervishes. Coarse woollen and cotton goods, as also the finest silks, and leather boots, are manufactured.—Bokhara is supposed to be the Trybactra of the ancients. In the middle ages it was successively the capital of Turkistan, of the Samanides, and of various Mongol rulers. In 1219 it was captured and burned by Genghis Khan, but was rebuilt soon after. In 1370 it was captured by Tamerlane, whose dynasty reigned there till 1498. Since that time the history of the city is merged in that of the khanate.—See "Bokhara, its History and Conquest," by Prof. Arminius Vámbéry (London, 1873).

BOL, Ferdinand, a Dutch painter and etcher, born at Dort in 1611, died in Amsterdam in 1681 or in 1686. He was the pupil of Rembrandt, and is best known by his admirable portraits in the style of that master, though he likewise executed historical paintings. Many of his works are still to be seen at Amsterdam.

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